$4.00 a Year FORESTRY Published Monthly DEC 19 1944 50c a Copy

VETERINARY MEDICINE

JANUARY 1945

CONTENTS

Veterinary Progress, Policies and Comment 1-6

Army Ration Contains Large Per Cent of Meat, 1; Riboflavin Synthesized in Intestine, 1; Repair of Severed Nerve, 1; Chemical Which Causes Fever Discovered, 1; Vitamin C in Zakelak Nut, 1; Sulfadiazine for Streptococcic Sore Throat, 1; Nutritional Ailments Prevalent on Fur Ranches, 2; Screw-worm Causes Loss of Young Mink, 2; Fur Pelt Production, 2; Early Priming in Foxes, 2; Anthrax on Fur Ranches, 2; Mink Susceptible to Botulism, 2; Recognition for Veterinary Journalism, 3; Veterinary Education, 3; Strength of the Army Medical Department, 4; Record Food Inspection Protects Army's Health, 4; Vaccination of Adult Cattle against Brucellosis Receives Official Approval, 4; The Philippine Islands, 5; Veterinary Service in Nova Scotia, 6; Great Quantities of Meat Inspected by the Veterinary Corps, 6; Veterinary Corps Led in Tetanus Immunization, 6.

Twenty Years Ago—Events of 1924 7

Veterinary Practice in London in Wartime 10

Army Pets and Mascots a Veterinary Problem 11

Unusual Type of Anthrax in Horses and Mules 12

Control of Brucellosis 14

Vitamins of the B Complex in Surgical Practice 16

War Dogs Trap Japs in Burma 18

Neoplasms in the Dog 19

Sexual Hormones in the Treatment of Mammary Tumors in Aged Bitches 20

Clinical Reports 24-31

Mastitis Control by Vaccination, 24; Restraint for Castrating Large Boars, 24; Parturient Paresis with Complete Prolapse of the Uterus, 25; Results of Brucellosis Vaccination of Mature Cows, 26; Scrotal Incarceration of the Small Intestine in a Cow, 27; Dystocia Due to Gastrodidymus Octipes, 28; Spread of Anaplasmosis, 28; Facts, Fancies, Fads and Fallacies in Animal Nutrition, 29; Hemoglobinuria in Calves, 30; Arsenical Poisoning in Cattle, 31; Some Interesting Animals I Have Known, 31.

Abstracts 32-35

Dourine Trypanosome Transmissible to Avian Host, 32; Intravenous Injections, 32; Effect of Vitamin B on Toxicity of Sulfonamides, 32; Nodular Worm Infection in Sheep, 32; Pemmican, 33; Action of Vitamin B in Shock, 33; Vitamin C—Sulfonamide Compounds in Wound Treatment, 33; Rupture of the Prepubian and Subpubian Tendons in the Cow, 34; Outbreak of Psittacosis in Army Pigeons, 34; Feeding Habits and Effect upon Coccidiosis in Chickens, 35; Intradermal Test for Trichomoniasis, 35; Wound Treatment, 35; Cattle Grubs, 35.

Book Reviews 36-38

Backyard Poultry Keeping, 36; Conquest of Bacteria from Salvarsan to Sulfapyridine, 36; Trichinosis, 37; An Introduction to Public Health, 38.

Useful Bulletins, Circulars, Etc. 38

VOL. XI. No. 1

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879.

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VOL. XL JANUARY, 1945 No. 1

Published Monthly by the
VETERINARY MAGAZINE CORPORATION
7632 S. CRANDON AVE., CHICAGO 49, ILL., U. S. A.

$4.00 a year; per copy 50 cents; Special Issues $1.00

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Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879. Entered as second-class matter under the title of American Journal of Veterinary Medicine July 19, 1910, at Chicago, Ill., under the Act of March 3, 1879.

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A Chicago man has invented an oven that smokes and cooks meat at the same time.

In an experiment conducted by Doctors Heilman and Herrel of The Mayo Clinic, slightly more than half of the mice inoculated with 10,000 M.L.D. of anthrax organisms survived when treated with penicillin.

More than 38% of the army ration is made up of meat, meat food and dairy products. More than 22,500,000 pounds of such foods are inspected daily by the Army Veterinary Corps. Rejections average about 4% because of unsatisfactory condition or failure to meet requirements as to type, grade or class.

Recent research has shown that riboflavin is synthesized in considerable quantities in the human intestine. It was shown that this supplementary source of riboflavin is adequate in man even when the diet is low in this vitamin. Since riboflavin deficiency does occur, it is deduced that it is probably due to dysfunction of the intestine together with a diet low in riboflavin.

Many of the deformities that sometimes result from severed nerves that are sutured together again with silk or tantalum wire can be corrected or alleviated, sometimes years later, by severing them and then rejoining them by means of a clot composed of plasma from the blood of the person on whom the operation is being performed (autologous plasma clot suture), according to I. M. Tarlov, M. D. (*J. Am. Med. Ass'n*). He believes that the new technic should replace the old procedures.

It is estimated by the extension agricultural department of the University of Minnesota that 9,000,000 chicks are lost annually from the time they are hatched until the remaining fowls are ready for market or egg production.

Pyrexin is the name given to a chemical discovered by Dr. V. Menkin of Duke University which he believes to be the cause of fever accompanying inflammation. It is released from red blood cells ruptured in the course of injury or disease.

The zakalsk nut, especially while green during the spring and summer, contains 50 times the vitamin C content of the citrus fruits. Vitamin from this nut is produced extensively in the U.S.S.R. where there are thousands of acres of zakalsk forests.

Early in 1943, cases of streptococcic (hemolytic) sore throat began to appear in numbers at many of the naval training stations. The disease increased in prevalence until it was assuming the proportions of an epidemic at a number of stations and seriously interfering with training schedules. Then a gigantic experiment was tried. Six hundred thousand sailors were given daily small doses of sulfadiazine and 350,000 were left untreated as controls. Result: The incidence of nose and throat ailments in those receiving the prophylactic treatment fell to one-tenth of what it was in the untreated. Also the cases of pneumonia and rheumatic fever were reduced in number and the incidence of meningitis was reduced, practically, to zero. The sulfadiazine prophylaxis had no effect on virus diseases, e.g., the "common cold."

Nutritional ailments were more prevalent than usual on fur ranches last season. The condition is charged to experimentation with new rations and also to the scarcity of animal proteins and of vitamins A, D and B_1.

Screw-worm infestation took an increasing toll of young mink during the past season. Darkening the nests and keeping the young mink dry avoids most of the trouble. Treatment of affected mink is successful if begun early. The chief difficulty in treatment lies in discovering the trouble in time.

Fur Pelt Production

The United States Department of the Interior reports that prior to the war, the yearly production of silver fox and mink pelts in the principal ranch-fur producing countries was: Norway, 400,000 fox; United States 270,000 fox, and 150,000 mink; Canada 250,000 fox and 125,000 mink; Sweden, 110,000 fox and 40,000 mink. Sweden produced also a large number of blue fox.

Producing Early Priming in the Fox

In recent research at the U. S. Fur Animal Experiment Stations, Saratoga Springs, N. Y., it was shown that pelage growth in silver fox is governed chiefly by light and to only a minor degree, if at all, by temperature. It has already been determined that the fur cycles of growth and shedding in mink and weasel that shed twice a year is governed principally by the varying amount of light at the different seasons. This experiment indicates the same phenomon controls pelage growth and recession in the fox, which sheds but once a year.

In the experiment, 16 silver foxes, eight males and eight females, were artificially lighted to extend the day and shorten the night an average of two hours during April, May and the first 20 days of June. The lighted animals molted five weeks earlier than the controls and their fur reached prime condition on November 5th. The controls were not prime until December 7th.

This saving of a month's feed and labor of caring for foxes will constitute a large economy in the production of silver fox pelts.

The investigators point out that the number of animals used in the experiment was small and final conclusions should not be drawn until the test has been repeated with a larger number of animals, and perhaps applied under field conditions. The cost of electric current was 60 cents per fox in the experiment but it is thought this sum might not apply under field conditions.

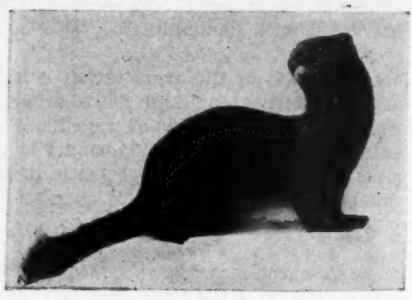
Several outbreaks of anthrax and botulism were reported on mink ranches during the past season. The former from feeding the flesh of animals dead of the disease and the latter from feeding partially putrefied meat.

Distemper of fox and mink is still the most destructive disease on fur ranches, notwithstanding a successful vaccine for the prevention of the disease has been available for several years.

Moldy or fermented cereals when fed to foxes are often responsible for bloating in these animals, particularly if the contaminated cereals are fed dry. Cereals intended for fox feeding should be stored in a dry place where they will not mold. They should also be protected from rats and mice. Rat and mouse feces in cereal feeds given to foxes is supposed to have caused some serious losses.

Mink Susceptible to Botulism

Contrary to what is generally supposed to be the rule among carnivorous animals, mink are susceptible to the toxin produced by *Clostridium botulinum*, according to Dr. E. R. Quortrup, who reports[1] two outbreaks of botulism on mink ranches.



On one ranch, 461 of 500 mink died. The carcass of a calf that had died of pneumonia and lain in the field for two days had been ground up and incorporated in the feed of these animals. Losses began on the day after this food was eaten and continued for four days.

On the other ranch horse meat, the history of which was unknown, was fed. There 200 of 5,000 animals on the ranch died. On this ranch polyvalent botulinus antitoxin (A, B and C) was given to affected animals with good results.

The only symptom exhibited by affected animals was progressive paralysis, usually beginning in the hind quarters. There were no characteristic lesions.

[1] *Am. Fur Breeder*, 17:3 pp. 28-30, 1944.

RECOGNITION FOR VETERINARY JOURNALISM

Presentation of an Award of Merit to VETERINARY MEDICINE for Editorial Achievement. The presentation was made at the 22nd Annual Meeting of the National Industrial Advertisers Association in Chicago, September 21-23, 1944. Awards were made in six classes and there were 305 magazines entered in the competition. The presentations were made by Roland G. E. Ullman of Philadelphia, chairman of the jury which judged the contestants. This was the seventh annual editorial competition in the business, trade and class magazine field and the first in which an award went to a magazine in the medical field—either human or veterinary. It constitutes a signal recognition of veterinary journalism. The wording on the certificate reads: "For Editorial Achievement, 1944. Award of Merit to VETERINARY MEDICINE, for the best published research in the twelve months ending July 31, 1944, in the seventh annual competition conducted by Industrial Marketing." The research referred to is that of Dr. J. W. Patton, into the cause, prevention and treatment of acetonemia in dairy cattle

Veterinary Education

Our present standards of veterinary education in the basic sciences have a sound basis but the average veterinary graduate of today shows a sublime inability in the faculty of reasoning and in the use of his hands in the performance of professional tasks.

The strength of our medical colleges lies in the fact that they revolve around clinical medicine, but there is no veterinary college in this country that is built around clinical medicine.

To remedy the situation, provision should be made for veterinary students to practice the art of veterinary medicine during the latter part of their college training.

The clinical staffs in our veterinary colleges should have at least one staff member for every 10 students. Further, in selecting students for publicly supported schools the selection should be made on a rural background, personality and the psychological attitude of the prospective student, rather than on scholastic attainment alone.—*Jas. Farquharson, President, A.V.M.A., at 25the Annual Illinois Veterinary Conference, Oct. 4, 1944.*

Strength of the Army Medical Department

In connection with the recent announcement that the Army is no longer recruiting physicians, the following figures are of interest:

The Army Medical Department has grown from 8,010 at the beginning of World War I until it now numbers 680,891. Of this number approximately 44,651 are in the Medical Corps, 14,948 in the Dental Corps, 2,012 in the Veterinary Corps, 2,364 in the Sanitary Corps, 15,078 in the Medical Administrative Corps, 59 in the Pharmacy Corps, 40,305 in the Army Nurse Corps, and there are 559,327 enlisted men, 813 Physical Therapy Aides, and 1,334 Hospital Dietitians.

The volume of items processed by the Medical Department exceeded that of the Quartermaster in September of this year. The Medical Department processed 144,000 line items for overseas as compared to Quartermaster's 141,000. Only Ordnance and Engineers exceeded the Medical Department. A like comparison is evident for domestic shipments. The Medical Department processed 313,000 domestic line items and was only exceeded by Ordnance and the Quartermaster.

Record Food Inspection Protects Army's Health

The Veterinary Service is concerned not only with the health of animals of the Army, but also protects the health of Army personnel through the inspection of meats, meat-food and dairy products which constitute about 38% of the soldier's ration.

According to Colonel H. K. Moore, V.C., Chief of the Meat and Dairy Hygiene Branch, the Veterinary Corps is inspecting over 700 million pounds of foods animal origin per month. The scope of this work may be judged from the fact that the armed forces require each day about 19,000 cattle, 27,000 hogs, 600 calves and 5,000 sheep and lambs—all of which must be inspected to insure that it is fit for food and that it complies with army specifications as to weight, class and grade, method of processing and packaging.

Because food of animal origin more than any other food is dangerous to the soldier's health when contaminated or spoiled, the Army maintains the strictest possible supervision over these products from the time of purchase until the food is served. As a result, no serious widespread outbreaks of disease traceable to the issue of unwholesome meat, meat-food or dairy products have occurred among our troops.—*News Release, Office of the Surgeon General.*

Of the many outbreaks of foot-and-mouth disease occurring recently in widely separated areas of England, Wales and Scotland, in almost every case the original outbreak it appeared among pigs fed on swill and then among cattle on farms where swill was used for feeding pigs. In most instances it doubtless was caused by the feeding of unboiled or improperly boiled swill.

Improved Pyrethrum Spray

Chemists of the Agricultural Research Administration have developed an odorless, non-irritating spray—non-poisonous for man but deadly to flies, mosquitoes and most other invertebrate household and barn pests. It consists of highly purified pyrethrins dissolved in a suitable menstruum

These pyrethrins are also suitable for the "aersol bomb" which the armed forces use by the million against mosquitoes, flies, cockroaches, ants, spiders, ticks and fleas.

Vaccination Speeds Progress of Brucellosis Campaign

Vaccination against bovine brucellosis is hastening the suppression of this costly cattle malady, Dr. A. W. Miller, Chief of the Bureau of Animal Industry, told members of the United States Live Stock Sanitary Association, at their annual meeting in Chicago, Dec. 6.

Since 1940 when the vaccination of calves was first adopted as a supplementary means of combating the disease, other beneficial uses have been found for the vaccine. Further research has shown that vaccination is as effective in adult cattle as in calves and that the vaccination of entire herds has given good results in stopping the spread of infection. This procedure is of special advantage in beef herds in which calf production is the principal requirement, and in "problem herds" where other methods of control have failed.

The Bureau recommends close cooperation between herd owners and state livestock officials in order that the method of control best suited for individual cases may be used. The choice is commonly influenced by the degree of past and present infection, size and type of herd, management facilities and possible exposure to infection from other premises.

Owing to variable conditions and types of cattle raising in different States, the Bureau of Animal Industry does not recommend one fixed plan. Rather, Doctor Miller said, it has provided several from which states may make selections. They are (1) the test-and-slaughter plan, (2) test-and-slaughter with calf vaccination, and (3) test-and-retention of reactors, with calf vaccination.

The Philippine Islands

As readers of the "Veterinary Military History of the United States" know, the Spanish-American War in the Far East and the Philippine War, that immediately followed it, had much to do with the development of our Army veterinary service. Since the Philippines have been much in the news of late and will continue to occupy a prominent part in the war against the Japs, some general facts concerning the Islands, their Peoples and their history may conduce to a better understanding of the conditions under which hundreds of thousands of American soldiers are fighting the toughest of all wars.

CLASS OF 1941, COLLEGE OF VETERINARY SCIENCE, UNIVERSITY OF THE PHILIPPINES
This is probably the latest class graduated from this school in the Philippines. However, there is a better day coming for these veterinarians and all other Filipinos. Faculty members shown are: 1. Dr. Amado E. Baladad, 2. Dr. Lope M. Yutuc, 3. Dr. A. K. Gomez, 4. Dr. Arcadio C. Gonzago, and 5. Dr. Faustino S. Mensalvas

The Philippine Islands are the largest group in the Malay archipelago. They have a land area of 114,000 square miles and a population of 13,000,000. Thus they are approximately the size of Arizona or Italy, with nearly 30 times the population of the former. There are 7,000 islands in the group, but only 466 have an area of more than one square mile. Luzon has an area of 40,814 square miles, Mindanao, 36,906, Samar, the first to be captured, 5,123 and Leyte, site of General McArthur's headquarters, 2,799 square miles. Manila, the capital, has a population of about 400,000.

The Islands lie in the Torrid Zone, north of the Equator and have a tropical climate. There are three seasons; November to March is least disagreeable. The temperature rarely goes above 70 degrees in December. From March to July the climate is hot and dry; being hottest in May. From July to November is the rainy season. Fifty mountains exceed 5000 feet elevation; the highest being more than 10,000 feet.

The Philippine Islands were discovered in 1521 by Magellan, who was killed on one of them, shortly afterward. Occupation and conquest by Spain really began in 1565 and was not complete until 1600, but uprisings of the native population occurred almost continuously until 1663 when all Chinese were expelled from the islands. The expulsion of the Chinese was followed by a century of economic decline and almost constant conflicts between the church and state. In 1762 Manila was captured by the British, but was returned to Spain by the Treaty of Paris, in 1763, which ended the French and Indian War in North America.

Following 1782 the Philippines enjoyed an era of great prosperity and in 1830 Manila

was opened to foreign ships. Although the Spanish laws and decrees were fairly just, venal administrators oppressed the people greatly and from 1841 till the American Army arrived, revolts against the authority of Spain and of the Church followed one another in rapid succession. For a long period, to pay its soldiers Spain assigned to each soldier a number of native families who were to pay him tribute. As most of them had not the wherewithal to pay tribute they became his slaves.

When Admiral Dewey captured Manila in 1898 it ended 300 years of nominal Spanish rule which had been characterized throughout by greed and cruelty. The Filipinos, disappointed at not being granted autonomy, for which they had been striving since before the American Revolution, revolted against American occupation. The main insurrection was quickly suppressed but it required several years to complete the conquest.

There are 40 tribes or groups of tribes in the Philippines. Fifteen different languages and a much larger number of dialects are spoken. In the 40 years of American rule the people of the islands made many times greater progress, economically, educationally and socially, than in three centuries of Spanish rule. Commerce and agriculture flourished, the plagues of man and animals were eradicated or brought under control and a large measure of autonomy instituted. At the time of the Jap attack in 1941, 40% of the children of school age were in school, and at the University of the Philippines 8000 students were enrolled.

★ ★ ★ BUY WAR BONDS ★ ★ ★
AND HOLD THEM

Veterinary Service in Nova Scotia

The government of Nova Scotia has adopted a plan to make veterinary service available to all livestock owners at uniform prices. Briefly the plan provides:

A contract with a veterinarian to practice in a given district for which he is a receive a retainer of $2,000 a year. The funds for the payment of the retainer are contributed one-fourth by the farmers association, one-fourth by the local government and one-half by the provincial government.

The $2000 annual payment is to defray the veterinarian's mileage charge and, if more than sufficient for that purpose, to constitute a subsidy—an extra inducement to practice in the locality.

The veterinarian on his part agrees to make all calls at a uniform rate—either $2.00 or $3.00, as may be agreed upon, plus the cost of medicines and other materials required.

The veterinarian is to handle his practice as his judgment dictates, and the manner in which he sees fit to render a veterinary service to the community is not to be interfered with. He is responsible for the collection of his own fees, except of course the $2000 retainer.

The Army veterinary service is inspecting more than 22 million pounds of meat and meat products and dairy products daily, for the armed forces.

Army Veterinary Corps Led in Tetanus Immunization

The Surgeon General announces that tetanus has been virtually eliminated from our armed forces as a result of compulsory vaccination. Not a single case has developed among vaccinated soldiers or sailors. A few scattered cases have occurred prior to vaccination or before the immunization process was complete.

The Medical Corps is entitled to, and receives, great credit for this saving of lives and suffering from a disease that was held only to a low incidence in World War I by the use of tens of thousands of doses of tetanus antitoxin.

It appears never to have been pointed out that the Veterinary Corps of the Army employed universal immunization against tetanus for army horses several months before compulsory vaccination for the prevention of tetanus in the military personnel was initiated by the Medical Corps.

In the early summer of 1941 some 10,000 horses, intended for use in the maneuvers of that year in Louisiana, were given tetanus toxoid at Fort Bliss, Texas, by direction of Col. D. B. Leininger, V.C., then Station Veterinarian at the Fort. Notwithstanding the exposure on maneuvers was severe and no tetanus antitoxin was used, no case of tetanus developed among approximately 9000 of these animals which were employed in the maneuvers.

In the 30th Veterinary General Hospital alone, 366 "foot cases" from among these immunized animals and several hundred wounds of other portions of the body were treated. It is reasonable to assume that, but for the prior antitetanic vaccination, 600 or more doses of antitoxin would have been used. It is also conservative to suppose that but for the prior immunization, among 9,000 horses employed in a district where the incidence of tetanus in native horses and mules is notoriously high a dozen or more cases of the disease would have developed from inoculation through unnoted wounds, but no such cases did develop

Twenty Years Ago—Events of 1924*

THERE was a further decrease of horses in cities (Chicago about 10%). An increase in the number of dairy cows, a decrease in the number of pigs farrowed in the spring.

An increase in poultry practice and interest in poultry diseases. At 51 association meetings, short courses and conferences, reported during the year, 25 or 50% included papers on, or clinical demonstrations in, poultry practice.

A growth of interest in canine practice was also shown at veterinary meetings. Many new small animal hospitals were erected in cities and towns all over the country.

The U. S. Bureau of Animal Industry was 40 years old on May 29, 1924. The bureau had more than 5,000 employes (about one-third veterinarians).

The year marked the holding of the record meeting of the A.V.M.A. at Des Moines, Iowa, in August, this being the 61st annual meeting of the association. The attendance of men was nearly 900, and the women numbered approximately 200. The literary program and clinic were exceptionally high class.

After continuous operation for more than 30 years, the Indiana Veterinary College closed early in the year. This left 11 recognized veterinary schools, all but one of which were state institutions.

In 11 colleges in the United States and one in Canada, the total enrollment of veterinary students was 592—164 first year, 123 second year, 147 third year, 141 fourth year, and 17 special students.

The deaths of six veterinarians, widely known among the profession, occurred in 1924:

Leonard L. Conkey, founder of the Grand Rapids Veterinary College and inventor and manufacturer of the equine operating table and Conkey hopples.

Fred Torrance, formerly Veterinary Director-General of Canada.

Septimus Sisson, leading veterinary anatomist, Ohio State University.

Duncan McEachran, F.R.C.V.S., founder of the Montreal Veterinary College. He was the last of the four pioneers of veterinary education on this continent, the others were James Law, Alexandre Liautard and Andrew Smith.

M. H. McKillip, Chicago, Ill., founder of the McKillip Veterinary College, and well known as an educator, surgeon and practitioner.

John H. Blattenberg, Lima, Ohio, one of the most widely known of veterinary practitioners.

THE FOUR PIONEERS OF VETERINARY EDUCATION ON THE NORTH AMERICAN CONTINENT

James Law

Andrew Smith

Duncan McEachran

Alexandre Liautard

Diseases

Foot-and-mouth disease made its appearance in California, February 20. The outbreak spread to some 15 or 16 counties and required a public expenditure of about $5,000,000 to suppress it. No sooner was the California outbreak checked than the disease appeared in Texas near Houston on September 27. This outbreak was confined to a few counties and the disease was eradicated in a comparatively short time. The Texas outbreak constituted the eighth invasion of the United States by foot-and-mouth disease, previous outbreaks having occurred in 1870, 1880, 1884, 1902, 1908, 1914 and the California outbreak early in 1924.

Anthrax was unusually prevalent in several southern states during the year, extensive outbreaks being reported in Mississippi, Ten-

*Veterinary Medicine, 20:1, pp. 7-8.

nessee, Arkansas, Louisiana and, also, Texas.

An increase of sarcoptic mange in swine was reported in April by Dr. A. T. Kinsley, who called attention to the extensive damage this condition causes to pork products, it being estimated that the presence of mange costs

S. L. Stewart, Eminent practitioner

W. H. Boynton, University of California

the producer 60 cents for every hog sold to the packer.

A lung disease in foxes was reported by Dr. Geo. A. Jeffreys of Detroit, Mich. The malady has symptoms somewhat similar to distemper but was thought to be a different disease. The course of the sickness is from two to four weeks. The mortality is high.

Hemophilia in milk cows was described by S. L. Stewart of Olathe, Kansas.

Dr. Hubert Schmidt, of the Texas A. & M. College, reported that "loin disease" or "down in the back"—a disease peculiar to cattle in the coastal region—is identical with the malady in South Africa known as lamzeitke and described by Sir Arnold Theiler as being due to the eating of bones containing putrid products, this abnormal craving is the result of lack of phosphorus in the feed. The remedy recommended is that cattle be fed sterile, sweet bone-meal.

Porcine orchitis as a sequel of vaccination was reported by Dr. A. T. Kinsley. One instance was cited in which a carload of boar pigs were vaccinated and practically every animal developed orchitis within a few days after vaccination. This condition would be quite serious in breeding animals.

A case of Malta fever in a person was reported, from which an organism belonging to the abortus group, apparently of bovine origin, was isolated.

Field observations by federal veterinary inspectors established the fact that tuberculosis in poultry is an important source of tuberculous infection among swine. Of a total of 232,678 dressed hog carcasses condemned for various causes, nearly one-half were rejected on account of tuberculosis. In addition to the 100,110 whole carcasses, there were 1,099,253 parts of hog carcasses condemned.

J. R. Beach, California Experiment Station, reported that the nutritional disease resembling roup among poultry, which has caused extensive losses in that section for a number of years, has been determined to be due to vitamin A deficiency. Cod liver oil or green feed, such as lawn clippings, prevented the trouble. When green feed is not available, the author recommends the incorporation of yellow corn and buttermilk in the ration.

A report of an outbreak of paratyphoid dysentery in lambs made at the Des Moines meeting of the A.V.M.A., by I. E. Newsom of Colorado, appears to be the first published report of paratyphoid infection in sheep. Of 31,369 sheep exposed 1946, or 6%, died of the disease. A predisposing factor was hardship incidental to delay in shipment and exposure to inclement weather.

At the A.V.M.A. meeting at Des Moines, Hadley, Warwick and Gildow of Wisconsin, reported finding of prenatal infestation of fox pups by the larvae of *Belascaris marginata*.

W. H. Boynton, Philippine Bureau of Agri-

Hubert Schmidt, Texas Agricultural Experiment Station

culture, reported the development of a tissue vaccine for hog cholera.

Favorable results in the treatment of equine influenza with chlorine gas was reported by Lieuts. C. S. Williams and F. H. Woodruff in the Army Veterinary Bulletin. A test of chlorine gas in the treatment of shipping fever at the Chicago stock yards indicated it is of little or no value as there used.

The control of stomach worms in sheep by the administration of a 1% solution of copper sulphate was reported by E. M. Nighbert at

the Missouri Valley Veterinary Association meeting, St. Joseph, Mo., February 19. The work on which the conclusions were based covered several years of investigation and experiment.

The development of a natural aggressin for

I. E. Newsom, Dean, Division of Veterinary Medicine, Colorado State College

use against hemorrhagic septicemia by the use of highly virulent strains of organisms obtained from buffaloes, was reported by Wm. S. Gochenour, Pathological Division, B.A.I.

Shikles Brothers of Dearborn, Mo., placed on the market an appliance to lessen the work and increase the convenience of vaccinating hogs.

An improvement was announced in the production of canine rabies vaccine, one injection method, whereby this vaccine could be prepared from the central nervous system of dogs.

J. G. Horning and A. J. McKee of Houston, Texas, gave an account of their experience with the "fright disease" in dogs, which they attribute to hookworm infestation. Carbon tetrachloride was found to be effective in treating the condition. The opinion was given that the symptoms are a reflex meningitis produced by toxemia due to absorption of toxic material from the worms.

Sentiment favoring state-wide bovine tuberculosis eradication measures gained much strength during the year. Forty-eight counties were declared modified accredited areas. Certain of the packers paid a premium of 10 cents per hundred weight on hogs from modified accredited areas.

The number of cattle tested by accredited veterinarians increased nearly 200% over the number tested the preceding year, being about 440,000 for 1924. The Federal appropriation for paying indemnities was $400,000 greater in 1924 than in 1923. The total number of cattle tested during the year under the tuberculosis eradication project was approximately 5,820,000. One hundred ninety-nine bureau veterinarians, 217 assistant state veterinarians and 172 county veterinarians, a total of 588, were employed full time on this work.

The number of hogs lost from cholera during the year aggregated 2,772,002 animals—4.25% of the total number of hogs in the country and valued at over $27,000,000. Iowa was the heaviest loser from hog cholera and Rhode Island the lightest. The percentage loss was highest in Nebraska—6.4% of the value of all hogs in the state.

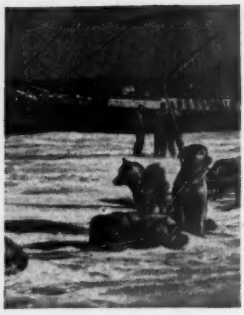
Reports from all parts of the world indicate the increasing use of the carbon tetrachloride treatment for ancylostomiasis in man. Rec-

The work of Sir Arnold Theiler led to the recognition of phosphorus deficiency in dairy cattle in the United States

ords have been kept of the treatment of more than a million and a half cases with a high percentage of success. Carbon tetrachloride was employed (5cc in capsules) together with magnesium sulphate at intervals of three to five weeks for a year in the treatment of gastrointestinal parasites in sheep and found to be effective. Discovery of the anthelmintic property of carbon tetrachloride was a product of veterinary research—by Dr. Maurice C. Hall.

In 1906 there were under federal quarantine for cattle ticks 15 southern states (975 counties). On December 15, 1924, there were only 253 whole counties and portions of 20 counties in quarantine in the 10 states in which cattle ticks still existed.

The authorized strength of the Army Veterinary Corps remained at 126 officers. Horses and mules belonging to the Army numbered 46,000, a decrease of about 6,000 from the animal strength for 1923.



Veterinary Practice in London in Wartime

By
C. A. P. BUCKNER
M.R.C.V.S.
London, England

A VETERINARIAN in London nowadays has many unusual jobs to do. The principal one of late has been to see that no animal, however badly injured, causes a hold up of rescue work when a flying bomb has fallen.

When I was called out to a bomb incident one morning, the rescued animals included two canaries, a cat whose paw was badly crushed and a dog with half his face blown away. Both required euthanasia. Luckily not all the rescued animals are in such bad plight. Often they are not even scratched.

If owners of animals are killed in a bomb incident, or cannot be traced, the animals are cared for by officials of N.A.R.P.A.C. (National Air Raid Precautions, Animals' Committee), made up of representatives of the most important humane societies in Britain and the Royal Veterinary College. Any expenses incurred in saving animals, or in finding new homes for them, is paid by N.A.R.P.A.C. But veterinary surgeons in Britain seldom charge fees for rescue work.

At the beginning of the war N.A.R.P.A.C. equipped all veterinarians with materials and instruments for first aid for horses and all other domestic animals. This equipment has been worth its weight in gold. Britain's veterinarians have priority labels stamped "Veterinary" for the windscreen of their cars. These enable them to get to any damaged place quickly.

Another veterinarian and I practice in a large suburb of London. We have arranged a rota of voluntary helpers on whom we can call at a moment's notice for first aid to animals in any crisis. Many persons have given up their garages for horse shelters in emergencies; special railings have been fixed in side streets to which horses can be tied should need arise. Voluntary helpers display cards in front windows of their homes, so that people in the district know where to take animals in emergency.

Morning surgery is very different now to what it was before the war. For instance, a large number of morning cases are minor glass casualties, mostly of the feet. One dog kept shaking his head up and down and whining with pain at every upward shake. The cause of this was soon clear—there was a small dagger-like piece of glass lodged in his collar and every time he threw up his head it pricked him.

Kennel accommodation in Britain now is taxed to the utmost. The difficult food situation and the draft of kennel maids has made it almost impossible to run a kennel. Few veterinarians can now operate a boarding and hospital establishment, for although they themselves are reserved, their staff is not.

British Information Services
Veterinarians bandage an injured dog amidst the ruins of a bombed area

Only food unfit for human consumption is allowed for animals, and even that is difficult to get. My own pre-war kennels have, for the duration of the war, been taken over by the Government as a war factory. Instead of my pre-war staff of seven with an assistant veterinarian I now have only one part time worker, a matron of forty.

On an average type of working day recently,

I began with a morning call at a wardens' post where, as a spare moment task, they have set up a well run piggery. There I inoculated a bunch of young pigs. Next was a sick cow.

As far as possible, I try to get owners of domestic animals to come to the surgery, for my petrol is restricted and, because of staff

British Information Services

E. Keith Robinson, governor and secretary of Blue Cross and of Our Dumb Friends' League, with a dog rescued from a bombed house

difficulties, I can manage only essential calls. I get a petrol allowance sufficient to cover moderate needs. This is based on a strict overhaul of the average week's work and the car mileage. The car is used *solely* for veterinary work.

In Britain the pre-war small animal practice of the city veterinarian has been replaced largely by food animal practice. Now the work is principally with horses, goats, pigs, poultry and rabbits, with a sprinkling of farm work.

After lunch I have letters to sign and orders to verify. Supplies have been difficult to obtain at times and I have had to keep vital drugs, such as sulphonamides, for urgent needs only. Domestic pets have to do with substitutes—and substitutes have never failed to do their job. Grain alcohol is now practically unobtainable in Britain, but long ago we substituted methylated spirit and have found it very satisfactory. Mange dressing powder has also disappeared so we substituted Derris dust and it has proved an excellent substitute. Mange liquid dressing has also been in short supply and is used only for urgent and severe cases. I have found it possible gradually, to build up a small stock of essentials.

Aqueous solutions are used instead of the tinctures or alcoholic solutions in all veterinary practices in Britain today.

Many of my supplies are kept at my residence because my main surgery is in a much-bombed area and I cannot afford to lose all my drugs at once. This main surgery has been bombed and blasted six times, once badly in the blitz of 1940 and once a few weeks ago by a flying bomb. Because of the risk of damage I keep no bottled medicines made up, and do my dispensing at the time of treating.

My home has just been badly damaged by blast from a near hit, and the top floor is now uninhabitable. The bottom of the house is shored up, and we can use that, although the stock room under the stairs and the shelter are the only places untouched.

Animals are not allowed in public shelters in Britain, so early in the war I built shelters at my surgeries. Now clients bring their pets in when the siren goes. Animals are not allowed on vehicles after black-out, so I have no patients come in during black-out hours, but do all my operations at that time.

I do a one-hour evening surgery before the light fails, to suit war-workers and those doing late duty. Barring operations, which, as I've said, I do after dark, it's the last of a long wartime day.

Army Pets and Mascots a Veterinary Problem

In addition to their regular duties as food inspectors and in conserving the animal strength of the command, army veterinarians perform a surprising amount and variety of work in caring for the health of mascots and pets of the military personnel. An example of this is seen in a report of animals in quarantine by Eighth Air Force, which is stationed in England.

In one two-month period, pilots of the Eighth Air Force flew into England 30 dogs, six monkeys, two parrots and one honey bear. Burros have been flown in from as far away as Africa. Our army veterinarians administer and enforce all British quarantine laws pertaining to imported animals within the U. S. military areas in Britain. Even when they apply to monkeys British quarantine laws are not monkey business.

Unusual Type of Anthrax in Horses and Mules*

By COLONEL RUSSELL McNELLIS**
Veterinary Corps, United States Army

ALTHOUGH most veterinarians are well acquainted with that ancient disease, anthrax, it is believed that the following brief article concerning anthrax in Peru may be of interest. These comments are based on four cases of anthrax, two in horses and two in mules, in Peruvian army animals that presented unusual post-mortem findings. A diagnosis would not have been positive without laboratory facilities.

History

As is the custom in the Peruvian army, most of the animals are turned into pastures a few weeks during the summer. On 1 March 1943 about 100 mules and 60 horses of the 2d Field Artillery (Pack) were turned into a pasture at Callao (near Lima, Peru). During the night of 18 March horse No. X0251 (16 years) exhibited an acute edema of the neck and was sent to the Army Veterinary Hospital via truck and died almost immediately upon arrival. Mule No. X328 (14 years), with an identical history, arrived on 19 March and died on 21 March. Horse No. X0222 (12 years) arrived 20 March and died 21 March, and mule No. X424 (13 years) arrived 20 March and was destroyed 21 March. All other animals were removed from the pasture to the stables, and no other cases resulted. This pasture was near a large packing house, and investigation revealed that several hogs had died in this pasture four or five years ago apparently from anthrax.

Symptoms

The first case died upon arrival at the veterinary hospital and exhibited a marked edema of the throat and lower neck that reached the chest and to such an extent that he almost assumed the appearance of a hippopotamus. Saliva was drooling from the mouth, and the attendant reported that he suffered from a severe dyspnea. While preparing to perform the autopsy of the first arrival, the second case appeared and an opportunity was afforded to observe the symptoms. This case (mule X328) exhibited the same symptoms as described above and as dyspnea was pronounced a tracheotomy was performed to prevent suffocation. The head and neck were held forward in a stiff, wooden manner. Temperature was 102° F.; mucous membranes, cyanotic; pulse, small and accelerated; respirations, labored. The other two cases presented identical symptoms. As stated, three of the cases died and the fourth was sacrificed.

Autopsy

To the writer, the most interesting phase was the post-mortem findings. Veterinary literature, almost without exception, records the enormous increase in size of the spleen in anthrax in the horse, and in the previous experience of the writer this had been true. However, in these cases, the spleen was normal in size and appearance. The subcutaneous and intermuscular tissues of the neck and throat regions presented a yellow gelatinous appearance and were permeated with petechial hemorrhages. There was a marked gelatinous, blood-stained infiltration of the peripharyngeal connective tissues which extended to the thorax. The mucous membrane of the larynx, pharynx, and trachea was edematous with petechial hemorrhages, and pulmonary congestion was noted. Hemorrhage was also noted along the coronary arteries of the heart. The appearance of the digestive tract, liver, spleen, and kidneys was normal.

In all cases, the post-mortem findings were similar to those frequently encountered in cases of anthrax in hogs except for the nor-

Horses belonging to the United States Army are immunized against anthrax when taken into infected regions. The animals of the first Cavalry Division and the 55th Cavalry Brigade, which took part in the 1941 Army maneuvers in Louisiana were given antianthrax vaccine and no case of the disease occurred among the nearly 9000 animals during the nine-week period that they remained in a heavily infected district in Louisiana and East Texas.

*Reprinted from *Bul. U. S. Army Med. Dept.*
**On duty with the Peruvian Army.

mal spleen and veterinary literature records that in some cases of acute anthrax in hogs the lesions are confined mostly to the throat region and that the spleen may appear to be normal.

Diagnosis

Although anthrax was suspected, when the normal spleen was found on necropsy such a diagnosis appeared to be incorrect, and smears for staining were made from the liver, spleen, and the edematous areas of the neck. Upon staining, those of the liver and spleen were negative while those of the subcutaneous tissues of the neck were definitely positive for *Bacillus anthracis*. These slides and subsequent cultures are still serving to demonstrate this organism to the students of bacteriology in our veterinary school.

From the symptoms as described and from the bacteriological findings a diagnosis of acute anthrax was made.

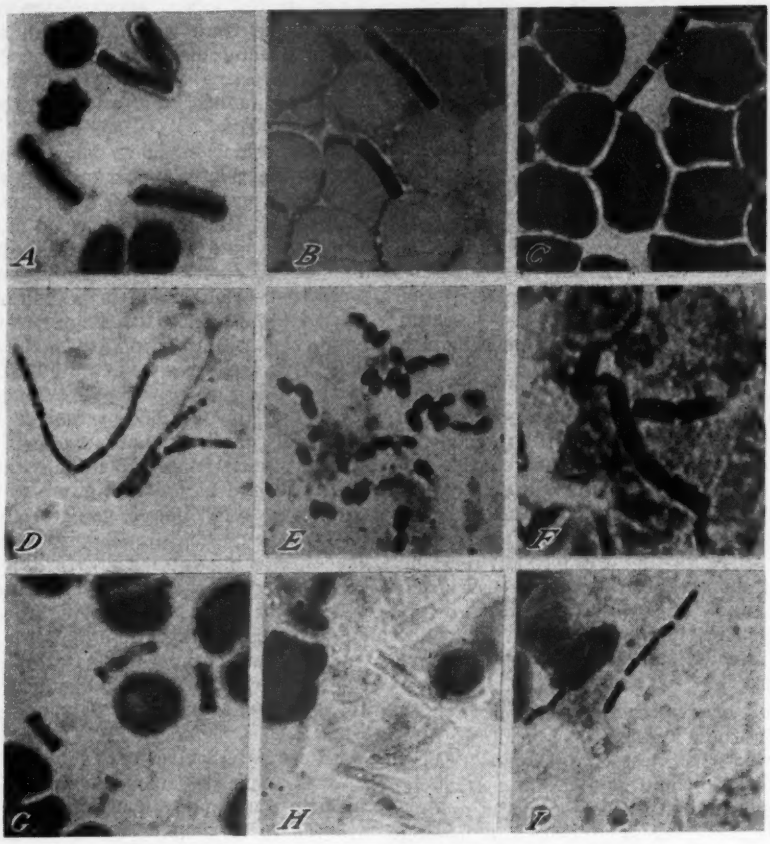
Treatment

Emergency tracheotomies were performed to relieve dyspnea, and large doses of anthrax serum were administered intravenously to three cases. No benefit was observed, two died in less than 48 hours and one was destroyed to prevent the spread of anthrax.

Conclusions

This brief discussion is made to emphasize the necessity of laboratory examination and the fallacy of diagnosis of anthrax only because of an enlarged spleen on autopsy. It also describes an acute type of anthrax in horses and mules similar to that seen in hogs and with a history of the infection that was possibly contracted from a pasture that was contaminated years before by hogs that died of this disease.

Since anthrax is prevalent, it is hoped that other veterinary officers assigned to Latin America may find this article of value.



STAINED ANTHRAX BACILLA AND SPORES—*Photo by C. D. Stein*

A. Bacilla, sheep blood (methylene blue) x 1700. B. Bacilla, guinea pig blood (Giemsa). C. Same (Hasting's) x 1600. D. Sporulating organisms, bovine spleen x 1400. E. Culture spores x 1900. F. Polarized light photo of bacilla in blood (methylene blue) x 2000. G-H. Ghost forms x 1500. I. Bacilla, guinea pig spleen x 1400

Control of Brucellosis*

TEST and hold, with gradual elimination including the handling of reactors to minimize the transmission of brucellosis in the herd had proved its worth long before we had any official programs. The owners of purebred herds were the first to adopt this plan and it is fortunate indeed that we have had their assurance and support in formulating later official plans. While the usefulness of this plan is limited, in the main, to carefully managed, raised herds, its effect has been to encourage the establishment of just such herds, and to discourage the practice of picking up a cow here and one there, a ruinous practice in which the danger is by no means confined to brucellosis. This plan required care, it involved inconvenience, and it carried with it its disappointments, but it was, and is, generally successful in raised herds, and it sustained a truth we will do well to relearn—we can raise a herd no higher than we can raise its owner. The plan was the entering wedge looking toward real control, and it still is yielding rich returns in careful hands.

Test and slaughter, applied to brucellosis, came through the gate when it was opened to a cattle reduction plan, under the momentum supplied by its success with tuberculosis and the weight of public opinion which fairly shouted that if cattle were to be killed at all they obviously should be the reactors. The points missed were that we may kill reacting cattle without establishing herds free from brucellosis and that the interherd transfers set in motion by the application of this policy in badly infected, large herds were ruinous in their effect.

I do not believe there were many men, schooled in the handling of brucellosis, who ever believed that test and slaughter as a blanket measure could be made to control the disease, but an irresistible logic was against this minute and helpless minority and, in some quarters at least, the plan was taken up with reluctance and misgivings.

Time and experience have shown that in small, lightly infected, raised herds, test and slaughter has its place, but that in heavily infected, large herds, replaced by purchasing, it is both prohibitive in cost and futile—even destructive in its effects. And the future will prove, if we will only limit its use and give it the opportunity, that test and slaughter will be useful in removing the few straggling reactors that remain in herds that are nearing the culmination of a plan based on test and hold with gradual elimination, with or without calf vaccination. It has no place where large numbers of good cattle are reactors, or where replacements must be purchased.

Because it has been injudiciously used, and not because it is inherently futile or even too expensive when wisely limited, test and slaughter has left at least one misconception in its wake from which we shall be slow to recover. Many disappointed breeders regard all blood testing as part of a plan involving test and slaughter, and brand all testing as a failure.

Calf vaccination, in its place, can be made a most effective weapon against brucellosis in that it prevents many abortions and, by lengthening the gestation period in cows that otherwise would abort, it increases the flow of milk. It is the only weapon we have so far that promises to yield much in herds sustained in effective production by buying and selling. Again, unfortunately, we are in the process of seizing an effective but limited weapon and casting aside all others. We are rapidly approaching a point, not by official decree but by actual practice, when our efforts to control brucellosis are bound up in the standard advice "you had better vaccinate" or by way of variation "Why didn't you vaccinate?" We have made it that simple. Once again we are expecting a single measure to do everything. On what do we base the assurance that it will? What do we know of it, and what remains to be found out?

Let us first enumerate the established facts as they apply to the pathogenicity of Strain 19 and to vaccination with vaccine prepared from it:

1. Vaccinated calves kept subsequently under natural exposure acquire valuable immunity that prevents many abortions.

2. There is good evidence that, if the exposure is sustained, protection effective in preventing extensive abortions tends to last through several gestation periods, but there are enough exceptions to this rule to cause considerable loss.

3. Vaccination causes most calves to react from three to six months, and a few to react indefinitely.

4. A vaccination reaction cannot be disinguished from an exposure reaction.

5. Vaccinated calves maintained subsequently under natural exposure frequently contract brucellosis in a degree that causes them later to spread the organisms in the milk and in the uterine discharges at calving time,

*Excerpts from an address by Dr. R. R. Birch, Ithaca, N. Y., at the 47th annual meeting of the U. S. Live Stock Sanitary Association.

and to react indefinitely.

6. Strain 19 has produced typical brucellosis in cows, and it has been isolated from the testicle of a bull suffering with severe orchitis. This bull was vaccinated as a calf.

7. Strain 19, as originally reported, is much lower in virulence than are the ordinary field strains.

We still lack answers to these questions:

1. How dependable will be the protection in calves vaccinated at the usual age, but not actually exposed to virulent field strains until several years later?

2. What are the dangers and benefits of adult vaccination, single or successive?

3. How long following the vaccination of mature cows does it require to build up dependable immunity?

4. In clean herds will Strain 19 used in vaccinating the calves endanger the adults appreciably?

5. Will Strain 19, known now to possess low virulence and high immunizing qualities, continue to maintain these qualities?

These knowns and unknowns clearly indicate that we are right in using vaccination systematically on calves in badly infected herds; wrong in using it as an only measure or in trusting it too far. It is clear that it prevents many abortions, but that it is not an effective preventive of a milder type of brucellosis accompanied by actual and frequent spread of the causative organism. These results have been brought out in controlled experiments in which demonstrated exposure accompanied by regular transmission has been present. It will take much longer for them to appear in field herds in which exposure depends on chance, often is long delayed, and the actual policy, frequently unstated, is gradually to eliminate reactors.

The momentum behind the tendency to substitute vaccination for all other measures is tremendous. Starting from a solid nucleus consisting of vaccine with proved value and proved limitations, it has fanned out in all directions into the unknown and uncontrolled. Again, all-or-nothing.

We expect, and may legitimately expect, vaccination to aid in the control of brucellosis, but by our action or inaction we confess ourselves powerless to control the vaccine itself when we have it in bottles, and the origin is known. It goes everywhere, is sold everywhere, and is used everywhere, living or not, refrigerated or not, by those who know nothing of its preparation, use, or keeping qualities. It is in many hands merely a bottle of medicine to be injected under the skin of each and every bovine animal. There are no records, only the usual crop of those who have "vaccinated and had fine results."

Vaccination itself, sufficiently governed and tied in with other methods of control, can be made to help us toward our goal which is more and more clean herds, less and less infected ones; but it is time we reestablish the goal and cease to tell our breeders it's impossible to protect their herds. It is time we encourage them to try, and aid them in their efforts. There will be individual failures with the goal before us, but only confusion and failure where it disappears.

After vaccination most calves reach three to six months —some react indefinitely

Let me describe what I regard as a sound approach to the problem of brucellosis in the individual herd. First a test of the entire herd, except calves; second, the setting up with informed and local professional advice, of a plan suited to the herd and to its environment, this plan to include protection so far as possible of the mature clean animals, vaccination of the calves as indicated, and the final weeding out in the course of time of straggling reactors, so that the disease will not again creep back into the semi-immune herd. It seems to me that official measures, in their essentials, should be made to do no less, and can do little more, than to reinforce this orderly process by giving aid to those who are starting out, recognition to those who succeed, and mounting safety as the years go by to those who purchase cattle from approved herds.

Variations in Beef

In one study, by reasearch workers of Agricultural Research Administration, samples of meat from steers of the same breed but differing in type were found to vary as much as 12% in moisture content, 23% in fat, 14% in protein and 7% in ash.

In other experiments differences in tenderness were found to be influenced by breeding and exercise; surprisingly, exercise increases the tenderness of meat. Tenderness generally decreases with age but an aged animal is not necessarily a tough one.

Vitamins of the B Complex in Surgical Practice

By LT. COL. J. LaVERE DAVIDSON, V.C.
Sioux Falls Army Air Field, Sioux Falls, South Dakota

TO OBTAIN good results in surgical practice the preparation of the patient for the operation and its maintenance afterward are recognized to be of prime importance.

It has long been known that the states of hydration and acid-base balance, as well as the condition of the cardiovascular system, are important factors to consider before and after operation. In addition to these, more and more importance is being attached to the question of vitamin status. It will be my objective in this article to review only the role of the vitamins of the B complex as they affect the practice of surgery.

Cause of Avitaminosis.—In general, four conditions involving vitamin metabolism may lead to an avitaminosis of greater or lesser severity: insufficient intake, insufficient absorption, increased requirements and increased elimination. Insufficient intake may result from any form of gastrointestinal disease which is accompanied by vomiting or diarrhea or from short circuit gastrointestinal operations. Increased requirements of B_1 may be expected in any condition in which the metabolism of carbohydrates is accelerated, such as fever, hyperthyroidism, exercise, and the intravenous administration of glucose. Where there is unusual loss of vitamins, as in the case of the increased excretion which accompanies polyuria and sweating, the requirements are, of course, increased. It is obvious that there are many conditions in this list which are especially prone to occur in the surgical patient.

Three Orders of Dose Level.—Starr[1] states that there are three orders of magnitude of vitamin requirements correlated with these conditions: (1) the amount needed for normal processes under normal conditions, (2) the amount needed to restore normal processes after deficiency or to maintain normal processes during critical emergencies and (3) the amount needed to reverse pathological organic changes resulting from deficiency. The second dose level may be several times the first, and the third may be 100 times the first; that is the daily normal requirement of thiamine may be 1 to 2mg; during an acute infection with fever about 10mg, but in acute beriberi 50 to 100mg a day would not be excessive.

It must also be remembered that it is now generally conceded that when a deficiency exists for one of the B complex there is more than likely a deficiency in the other members of this group. Not only are all of the components of the vitamin B complex closely associated in the utilization of foods, but their actions, in respect to the cellular oxidation-reduction system and maintenance of normal function and anatomical structure of many body tissues, are so closely interwoven as to make the occurrence of a single deficiency involving only one of the vitamin B complex factors distinctly unusual. It is also worthwhile to keep in mind that while the B vitamins are concerned with continuous processes of cellular nutrition and respiration as activators which are continually regenerated, they also are components of co-enzymes which are used up and require constant replacement.

Intravenous Fluids.—Perhaps the intravenous use of fluids, especially glucose solutions, a very common procedure in surgical practice, affects the vitamin requirement of the average surgical case more than any other factor. It has been pointed out by Sydenstricker[2] that maintenance of a human patient on parenterally administered solutions of dextrose for four to five days may produce a condition quite similar to the picture of acute thiamine deficiency resulting from alcohol characterized by neuritic pain, nerve and muscle tenderness, motor and reflex disturbances or edema and tachycardia. Edema occurring during prolonged venoclysis or repeated large intravenous infusions of dextrose solutions has long been attributed to the use of physiologic saline solution as a solvent for dextrose and the large intake of water and sodium has been blamed for edema. While it is quite possible to produce edema by overloading the vascular apparatus with fluids, Sydenstricker[2] states that this phenomenon seems relatively unusual and that in his experience every intance of "water-logging" associated with tachycardia, neuritic pain or tenderness of the extremities has shown prompt diuresis and relief of pain and tenderness as well as slowing of the heart when adequate doses of thiamine were given. Apparently the administration of large amounts of glucose solution intravenously, depletes the body's supply of B vitamins in two ways: (1) by increasing the utilization of co-enzymes without furnishing any replace-

ment and (2) by causing a polyuria which tends to wash out the water-soluble B vitamins.

Hyperthyroidism Preoperative Treatment.—Himwich, Goldfarb and Cowgill[3] showed that dogs receiving a yeast-free diet developed anorexia in 34 days on the average as compared with 17 days for dogs receiving the same diet plus desiccated thyroid. Drill and Shaffer[4] confirmed this finding. They have observed that when yeast is removed from the diet of a hyperthyroid dog there is a rapid fall in caloric intake and there is, also, loss of weight. By administering a sufficient quantity of B vitamins, it was possible for them to maintain the caloric intake and weight of three of four hyperthyroid dogs for as long as 112 days. These observations suggest that the vitamins of the B complex are related to the caloric intake and maintenance of weight in experimental hyperthyroidism. In view of these findings and that Thompson, Taylor, Meyer, and McNealy[5] have concluded that gain in weight is more important than any other factor in determining the outcome of operation in cases of toxic goiter, it would be well to consider carefully the value of B vitamins in the preoperative treatment of patients with toxic goiter who have the disease in severe form.

Infections.—It is common experience that many patients with operable infectious diseases or diseased conditions such as osteomyelitis, pyometra, suppurative peritonitis and extensive infected wounds or any severe sepsis may develop glossitis, usually of the rough, red "toxic type," occasionally the tongue is bright red and smooth. Mental confusion, delirium (as evidenced in small animals by fits and convulsions) are almost equally frequent. It is customary in most hospitals to administer large amounts of dextrose solutions intravenously to patients with such conditions to better enable these patients to withstand the ordeal of surgery.

Intravenous administration of liquid in a dog

Factors which seem to contribute to avitaminosis in these groups are fever, vomiting and the administration of large amounts of dextrose. Fever causes hypermetabolism with increased energy requirements; vomiting prevents the absorption of vitamins from any normal foodstuffs which may be taken; and glucose maintenance, as mentioned above, increases the utilization of co-enzymes without furnishing any replacement.

In discussing the role of vitamins of the B complex and infections, it is interesting to point out one more possible association, the clinical importance of which has not yet been established. The use of sulfonamides in infectious diseases is universally known and, being bacteriostatic, they tend to reduce the bacterial activity in the gut. In view of the fact that it has been shown that the bacteria found in the human intestine produce biotin, riboflavin, thiamine and niacin[6] it is possible

that sulfonamide therapy may predispose to vitamin B complex deficiency. The failure of the synthesized vitamins to escape freely from the bacteria makes much more experimental work along these lines necessary before the effect of sulfonamide administration on vitamin B deficiency can be definitely stated.

In small animal surgery, in patients suffering from pyometra, gangrene of extremities, or any infectious condition, it is believed by the author that beneficial results have been obtained by the parenteral administration of vitamin B complex (Solu-B)[7] prior to the operation[8] and continued orally in post-operative convalescence. It is felt that this post-operative period of recovery has been hastened by this procedure.

Hemorrhage and Shock—In concluding this article on the use of vitamin B complex in surgical practice, it should not be out of place to mention the beneficial effect of thiamine hydrochloride on the survival time of dogs in shock induced by hemorrhage. It has been found that dogs with a higher plasma level of thiamine were more resistant to the onset of shock than those with a low plasma thiamine. When thiamine was administered before bleeding, the blood pressure showed a constant tendency to return to normal after hemorrhage, enabling the animals to withstand more bleeding than the controls. Therapeutic administration of thiamine to dogs, in which hemorrhagic shock had been induced, prolonged significantly their survival time.

Summary—The author feels that the use of vitamins of the B complex in surgical practice in veterinary medicine is of great importance and will in certain cases decide the difference between recovery and death. This therapy is especially indicated in all forms of septic surgery and in those cases which require a preparatory glucose infusion. In those cases in which bleeding may be extensive or prolonged it is felt, in view of work which has been done, that the parenteral administration of thiamine hydrochloride in therapeutic doses is definitely indicated.

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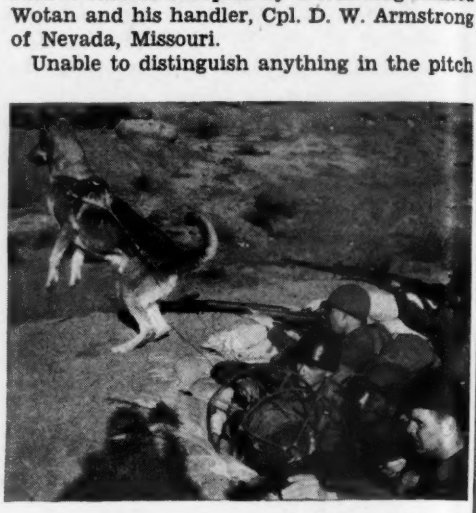
War Dogs Trap Japs in Burma

About 2:30 one morning an American Army Post in Burma was awakened by a commotion near a foxhole occupied by a War Dog named Wotan and his handler, Cpl. D. W. Armstrong of Nevada, Missouri.

Unable to distinguish anything in the pitch



Signal Corps, U. S. Army

Stringing telephone communications wire between outposts

darkness when alerted by the dog, Armstrong released Wotan who leaped upon the enemy—then only a half-dozen feet distant.

Investigation later revealed that a Japanese, armed with hand grenades had penetrated the outer perimeter and reached a point near the center of the position. He was wounded so badly by the ferocious attack that he could not escape. Rather than surrender he pulled a pin from a grenade and took his life.

Wotan is also credited with having brought about the death of several snipers by alerting their position.

Two other dogs in this theatre—Sailor and King—have been unusually effective in mop-up operations after the fall of Myitkyina—locating and pointing enemy soldiers who had escaped and hid in the jungle and in rice paddies. King and his handler were leading a reconnaissance patrol in search of an enemy force suspected of attempting infiltration. King alerted and the patrol was enabled to approach near enough to a party of 125 Japanese to listen in on their conversation.

Dropping back, the patrol radioed for reinforcements and, on arrival of the supporting platoon, directed fire artillery on the enemy position. The Americans harassed the Japanese force for 24 hours, virtually annihilating it, without once disclosing their own positions prematurely.

Neoplasms in the Dog

By LEON F. WHITNEY
Orange, Conn.

OF THE neoplasms in dogs operated upon in our clinic from June 29, 1941, to August 1, 1944, 145 appeared to the author to differ macroscopically. Only these, which seemed to be new types were saved for examination; the rest being discarded. But of those saved, and included in this study, many proved to be duplicates. Of the 145, 89 proved to be neoplasms, either malignant (66) or benign (23). It is probable that many of those discarded were of the benign sort, such as skin and fatty tumors. Many of the common breast tumors were discarded; a considerable percentage of them may have been malignant.

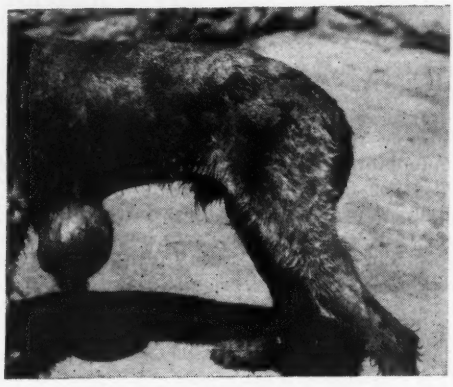
This study was suggested by Dr. C. C. Little[1] of the Jackson Memorial Laboratory at Bar Harbor, Me. The first nine specimens were sent to him for diagnosis, but packing troubles developed, and since the subject also interested Dr. Harry Zimmerman at Yale University numbers 10 to 95 were classified by him. Doctor Zimmerman entered the Navy in February, 1944, and then Dr. Harry Green, also of the Pathology Department at Yale, examined the last 50 samples and prepared the classification at the end of this paper. The author's part was simply performing the operations, preserving the specimens in 10% formalin, getting them to the laboratory where they were prepared and the diagnosis was made.

The purpose in presenting the report is to indicate some of the kinds of neoplasms to which dogs fall heir, in the event that students of the problem are interested and, in a smaller sense to show the public that dogs, beside sharing the fireside with man, also share one of his worst maladies, possibly in every form in which human beings have it and in some additional forms as well. It is surprising that many clients who present dogs for treatment are shocked that dogs too have "tumors and cancers."

No attempt is here made to describe the tumors, but in the event any are interested in any particular specimen, a description will be gladly sent, and duplicate slides are available to anyone interested.

No attempt is made to compare these results with previously reported neoplasms; there may be no new forms here reported, but the author is assured by students that a number are reported here for the first time.

Classification of the 145 samples submitted shows 21 different general types (listed hereafter). These, in some cases may be subdivided into several different types, so that the total, including the subdivisions runs to over 50 different forms. For example the semi-



A fibroadenoma attached to front leg of a dog

nomas vary greatly. It is also interesting to note that five sweat gland carcinomas were found despite the fact that many "authorities" in the past in their books have stated that dogs do not sweat through the skin. These tumors, however, all came from very restricted areas, and show that dogs definitely do sweat from certain areas.

Benign Epithelial Tumors (5)
- Papilloma 4
- Nauvus 1

Malignant Epithileal Tumors (50)
- Melanocarcinoma 11
- Sweat gland carcinoma 5
- Squamous cell carcinoma 8
- Mammary carcinoma 5
- Ovarian carcinoma 1
- Bile duct carcinoma 2
- Basal cell carcinoma 1
- Seminoma 8
- Other carcinomas 9

Benign Connective Tissue Tumors (18)
- Fibroma 6
- Lipoma 8
- Hemangioma 1
- Fibrochondroma 3

Malignant Connective Tumors (16)
- Fibrosarcoma 2
- Sarcoma 2
- Osteogenic sarcoma 1
- Lymphosarcoma 5
- Reticulum sarcoma 3
- Liposarcoma 1

[1] Doctor Little has been Managing Director of the American Society for the Control of Cancer since 1929.—*Ed.*

Sexual Hormones in the Treatment of Mammary Tumors of Aged Bitches

By C. HERMAN BECKMAN
St. Louis, Missouri

THE treatment of tumors of the reproductive organs of aged dogs by injection of ovarian hormone in the male and testicular hormone in the female constitutes a safe, convenient and effective method of dealing with this type of neoplasm.

The writer never having seen a mammary tumor in a spayed bitch and having noted in a number of instances that aged bitches with mammary tumors had also tumefaction or other abnormalities of the ovary concluded there may be a relationship between disturbances of the ovary and tumors of the mammae. This conclusion was further supported by the observation that, in general, mammary tumors in bitches are aggravated during estrus, sometimes doubling in size and activity and that they usually recede following the period of heat to nearly the size they were previous to the enlargement.

These animals are poor risks. If bred they are prone to suffer from dystocia, mastitis, metritis or eclampsia if death does not overtake them during delivery. Anemia is common, as is arteriosclerosis, asthma, cataract, nephritis and other infirmities associated with advanced age in this animal.

Since estrus manifestly caused an exacerbation of the condition in the tumor of the mammary gland in aged bitches it was decided to administer testicular hormone to such animals about 30 days before estrus was expected with a view to suppressing estrus and thus avoiding the consequent aggravation of the symptoms. The preparation used was "AN-S-TRO," which contains 55 grains of water soluble, protein-free extract of fresh orchic substance, per cubic centimeter.

The injections prevented the onset of estrus and the accelerated growth of the tumors and, when repeated, arrested the activity of the neoplasm and brought about a greater or lesser reduction in its size. Continued injections resulted in a complete disappearance of the smaller and more recent mammary tumors and, where cataracts were present, an improvement in the vision. The anemia was overcome. More specific details of the extraordinary improvement following the use of this treatment may be found in the clinical reports at the end of this discussion.

Muller and Glass state: "Various tumors and enlargements form in the mammary gland, such as fibroma, lipoma, chondroma, osteoma, adenoma, myxoma, sarcoma and carcinoma, and frequently mixed tumors, such as adenosarcoma, fibrochondroma, fibrosarcoma, chondrosarcoma, etc., and there may also be cyst formations. Some of these mammary tumors reach enormous sizes, hang down and sometimes touch the ground. As a rule these tumors are round, flat tumors being, as a rule, rare. They may be round or apple-like externally or they may be nodulated and irregular and fluctuate at certain parts. These fluctuating portions may open and discharge their contents forming an ugly, raw, unhealthy, cancerous ulcer, which is constantly licked by the animal and generally we find enlarged infected lymphatics in the surrounding tissues. Carcinoma is frequently found in bitches that are beyond middle age, in the form of carcinoma fibrosum, or carcinoma schirrosum, or partially as carcinoma medullare or myxoma and calcification or ossification, as well as cyst formations. Enlargement of the regional lymph glands is nearly always observed. The chief danger lies in the possibility of metastatic carcinoma of the lungs and liver. In 603 cases compiled by Stecker, 299 (49.5%) were mammary carcinoma. Among 50 of these cases one was in a 4-year-old bitch, eight were in 5- to 6-year-old bitches, 13 were in 7- to 8-year-old bitches, 10 were in 9- to 10-year-old bitches, three were in 11- to 12-year-old bitches, and four were in bitches 12 to 15 years of age. Froehner observed a case of mammary carcinoma in a male dog."

The relationship that exists between the internal secretion of the sex glands and old age is significant. Of 50 affected bitches there were 37 cases of complete removal of mammary tumors by this treatment, reduction of asthma and arteriosclerosis as well as reduction in the amount of flabby fat and general

improvement in condition and vision with greater activity. Seven cases showed marked improvement but not complete recovery and two cases died from general debility while under treatment. Four cases completed the course of treatment outlined but no record of the outcome was obtained.

The following is the general outline of the treatment. Variation in the particular case depends upon the symptomatology that presents itself in the course of treatment. In general the pictures of these cases are very nearly alike. First noted is that these animals usually show advancing age and a slight disturbance in the estrus cycle, accompanied in the beginning by a growth of the two posterior mammae and then a hard growth or seed (frog egg) clusters in the next two glands or one or more in the link. These neoplasms are usually malignant, either adenosarcoma or adenocarcinoma or mixed tumors. Those developing in the anterior glands are more fibrous in nature and usually more difficult to absorb. The death rate from either removal of mammary tumors that show malignancy or spaying the aged female with malignant tumors of the mammae has been relatively high, therefore the injection method is vastly superior. No observation of the effect of spaying such animals on the asthma, arteriosclerosis or cataracts has been made. It is not implied that this treatment will reverse the natural course of age or relieve the foregoing infirmities when they are concomitants of normal senility, but only that this rejuvenating effect is produced when the senility is premature and a result of ovarian dysfunction.

The general outline of treatment is as follows:

The animal is examined thoroughly and its general condition noted. The age varies from 5 to 19 years. The average age is 10 to 11. The picture is much the same in all cases—a slight anemia, cataract development, some asthma, some arteriosclerosis and adenosarcoma, adenocarcinoma, fibrous or mixed tumors.

Ten to 20 cubic centimeters of orchic substance (AN-S-TRO) is injected subcutaneously and an acetanilid compound or sodium salicylate, five grains three times daily, is administered *per os*. A bile salts tablet at night and hexamethylenetetramine is given to aid in the elimination of the absorbed tumorous substance. After 10 to 14 days another 5 to 10cc dose of orchic substance is injected and the synergistic daily treatment continued or altered according to the results. This dose of orchic substance is repeated every 10 days to two weeks. If anemia exists, and it usually does, iron and copper are added. After the third injection the amount of orchic extract is reduced to 3cc and the interval is increased to two weeks or three weeks depending on the progress of the case. Three injections have proved adequate in a few cases, however, the majority will require five to six injections. If estrus should occur in spite of the injections wait until it has passed, as an additional amount of hormone will be required to offset this activity. When the injections are completed ascertain the probable time of the next estrus cycle and repeat the injection 30 days prior to its expected occurrence and again at the time it should occur, to arrest completely the activity. Insufficient time has elapsed to determine the permanence of the cure. However, two years have passed on seven cases without further development of the tumors and the animals are as active as healthy dogs of their ages. One year has elapsed since additional cases were treated and the animals are still very active and no tumors have appeared.

A 14-year-old pointer was given three injections of orchic substance and then, as an experiment, it was given stilbestrol 4mg daily for seven days then 2mg daily for five days. The tumors flared up enlarging greatly and were highly active and aging of the animal was very rapid. No checking of the growth or advancing age was attempted. Stilbestrol should be avoided in females with ovarian troubles and mammary growths.

Four cases were treated where liquefactive necrosis had developed in these growths. A 10cc-dose of orchic substance checked the discharge, in one case within 24 hours and in a second in 72 hours. In the third case the discharge was reduced but not completely stopped. The size of the growth was reduced. The entire growth was then removed surgically with no recurrence. In the fourth case the discharge from three of the five sinuses was checked. Three of them were healed within one week and two remaining were much reduced and almost checked after the third injection. This fourth case was treated against our better judgment, but there was everything to gain with nothing to lose. The animal was a total loss before treatment was started. It was a 15-year-old fox terrier, anemic and emaciated, with a fetid discharge from five openings in a large tumorous growth about the size of an indoor baseball. After an injection of 10cc orchic substance three of the lesser openings stopped discharging and healthy granulation appeared. The other openings were reduced in size, the amount of discharge was lessened and the odor was less obnoxious. The physical picture was worse, possibly due to excessive absorption from the

tumorous mass. After three weeks there had been some improvement in the general condition and a very marked decrease in the size and character of the mammary tumors. Where the physical condition of the patient will permit it, the largest discharging growths should be removed surgically since their resorption induces a highly toxic condition in the animal. Perhaps a slower plan of absorption might be worked out to advantage. All cases should show general improvement after the second week. Where the tumors are small they show improvement immediately.

Summary

There is a hormone imbalance in some dogs with advancing age and this is the factor responsible for the growth and development of mammary tumors, cataracts, asthma (not all types) arteriosclerosis and general infirmities of senility before its time. The injection of the sexual hormone made from the natural glands of the opposite sex in some way results in the correction of internal secretions and better health and activity.

The spayed bitch devoid of breast tumors presents a problem of cataracts, asthma, arteriosclerosis which responds to the injection of the female hormone and stilbestrol.

Clinical Reports

Case 1.—Female, aged 12 years. Sluggish and phlegmatic; asthmatic breathing; arteriosclerosis, "pipe stem" arteries, calcification of heart with characteristic heart beat; cataracts in both eyes; anemia (dry skin).

The mammary involvement included tumors in various stages of development in all glands, ranging from frog egg clusters to large doughy masses, with cystic formation (liquefaction taking place). The posterior right mammary was in a state of liquefactive necrosis bordering on gangrene. There was a typical discharge and odor. This odor was what caused the owner to bring the dog to the hospital and request that it be treated. Clinically the case was one of malignancy. The temperature, pulse, respiration, appetite, bowel condition and urine were characteristic. The general condition summed up was—the animal was suffering from the infirmities of age.

Four cubic centimeters of male orchic substance was given subcutaneously, oral medication was given according to symptoms and included bile salts, acetanilid compound, copper and iron.

By the fifth day the odor was lessened and the discharge stopped. A second dose of 4cc orchic substance was given 10 days after the first injection and the sodium salicylate continued. The bile, copper and iron salts were discontinued at this time. The general improvement noted at the time of the second injection included; heart action and circulation improved; asthmatic breathing cleared, color restored to the mucous membranes, increased activity, skin more pliable and loose. The mammary involvement was subsiding there being a decrease in size of all enlargements.

Two months passed without further treatment. The discharging tumor was completely healed in 21 days and much reduced in size. Estrus appeared and activity of the mammary tumors was set up again. Injections of 5cc of orchic substance were again commenced and repeated every two weeks for three months, by which time there was complete absorption of most of the mammary tumors. One gland persisted but was much reduced in size. Surgical removal should have been resorted to, but it was decided that it might be best to wait and observe the reaction at the next estrus period. Nohing occurred for six months. The estrus began and a flare up of tumors occurred but they were not nearly so large or as numerous as they were at the time treatment was first begun. The greatest activity occurred in the posterior right mammary gland which was the one that originally was discharging and causing the offensive odor. It did not discharge or become odoriferous this time.

The entire mammary system was involved from the size of a pea to as large as a baseball. 1-5 Adenocarcinomas. A. Necrotic ulcerative area. 2-3-5. Posterior group of adenocarcinomas

Another injection of 5cc orchic substance was given subcutaneously and after two weeks the posterior right mammary gland was removed surgically. The patient stood anesthesia and surgery without shock and the surgical wound healed by first intention. The orchic substance in 5cc doses was continued at two-week intervals until four doses had been given. Thirty days before the next estrus was due another 5cc injection was given and the dog, now 14 years old, is lively and looks and acts like a dog of six. The life of this particular animal has undoubtedly been pro-

longed two years and, while not many more years can be expected for her, it appears she will enjoy such time as she has left.

The results of more recent investigation shows a tolerance for larger doses. This is exemplified by case No. 2.

Case No. 2.—This was a scotty female, nine years of age. The right posterior mammary gland was about the size of one's double fist, with a large amount of cystic formation. All else appeared normal. The condition was diagnosed clinically as carcinoma. A 10cc dose of orchic substance was given. Three days later the tumor ruptured and there was a copious icteric discharge, having a foul odor. The discharge ceased in 24 hours and normal granulation ensued. Healing was complete in 10 days.

A second 10cc-dose of orchic substance was given. The result was, complete absorption of the tumor and recovery. This particular scotty had not played in the past three years. Again it was chasing, teasing and romping like a normal healthy dog of its age or younger. What will happen on recurrance of estrus, time alone can tell. The result in this case indicates that the animal will tolerate larger doses of orchic substance than those previously administered and that a large initial dose gives better and quicker results; also the earlier treatment is started the better the results.

Case No. 3.—A female English setter, aged nine years, had steadily growing, multiple tumors of the mammary glands, apparently estrus was continuous. Ten cubic centimeters of male orchic substance was given subcutaneously and followed by a 5cc dose at two week intervals. Estrus was checked as long as the injections were continued. The character of the tumor growth changed from hard solid masses to loose and well circumscribed areas. They were also arrested and shrank in size.

The treatment was suspended by the owner after two months. Three months later a very active, full estrus cycle began. Treatment during such a vicious estrus was deemed futile, and the tumors flared up as was expected. After 60 days the cycle had subsided, but the tumors were doubled in size and some new ones had developed. After three doses of 10cc each of orchic substance given ten days apart, there was a pronounced decrease in size of all tumors and the skin was loose around each of them.

The entire set of growths and the glands were removed surgically. The most surprising incident in connection with the operation was that the blood vessels were so small or so contracted that hemorrhage was not encountered. This animal now has no mammary glands to be involved further and can be regarded as cured. My experience in operating upon cases, which had less involvement but no injections of orchic substance, have given me considerable trouble, due to hemorrhage or recurrence of the tumors and usually have resulted in death as a result of the operation or from accelerated development of tumors. Since the injection of orchic material has been employed as a preliminary to operation the mortality from surgical interference has been very low. Further, as stated in the foregoing, the number of cases that require surgery has been relatively few.

Cases Nos. 4-5-6.—These comprise three generations of a family of Bostons, which we will term as grandmother, mother and daughter.

The grandmother was brought to the hospital in 1936, in labor. One puppy was delivered normally and three were delivered by instruments. One male and one female puppy survived. The owner was advised against further breeding of the grandmother. She was seven years old and had multiple neoplasms of the mammary gland.

The pups were allowed to nurse for 48 hours and then bottle fed. The lactation was dried up and all went well with the bitch and her pups.

The grandmother developed false pregnancy after the following estrus period and died shortly afterward from natural causes.

The pup which we call mother was bred at her second estrus and whelped three pups, two males and a female. Breeding was attempted at the next estrus but conception did not occur. False pregnancy ensued and spaying was advised but was disregarded. At four years of age neoplasms in the mammary gland were definitely formed and she was spayed. There was a complete absorption of the new growths.

The daughter was never bred, but pseudocyesis occurred following the second estrus and she was spayed after the condition disappeared.

Cancerous traits were undoubtedly inherited in this particular family, but since mother and daughter were spayed there has been no evidence of any neoplasms in either.

Clinical Reports

Mastitis Control by Vaccination

Six years ago an experiment in mastitis control through immunization was undertaken in 20 dairy herds comprising 368 cows. Ten herds including 181 cows were vaccinated with mixed bacterins and 10 herds comprising 187 cows were given lacto-vaccine. Over a period of several years prior to the beginning of the experiment the number of cases of acute and chronic mastitis in these 20 herds had averaged eight cases per herd per year or a total of 160 cases per year.

During the six-year period of the experiment no new cases of acute mastitis developed in the 10 herds given lacto-vaccine, except in new cows added to the herds, but 10 cases of chronic mastitis were found—an average of one per year for the 10 herds.

In the 10 herds treated prophylactically with mixed bacterins, an average of four cases per herd per year occurred, some of them were acute; a total of 240 cases.

To recapitulate: The lacto-vaccine reduced the average incidence of mastitis in the ten herds in the experiment from 80 to one case per year and decreased the severity of such attacks as did occur.

The mixed bacterin reduced the average incidence of mastitis in the ten experimental herds on which it was used as a prophylactic just 50%.

From time to time during the experiment new cows were added, without being vaccinated, to both these groups of herds. In nearly all cases these unvaccinated animals developed mastitis in five days to three weeks. Both acute and chronic cases were encountered in these accessions to the herds.

No untoward results were experienced as a result of the vaccination, except in one herd of 47 cows. The lacto-vaccine was used in this herd and 28 of the animals developed abscesses at the point of injection. The cause was determined to be pressure at the site of injection by too tight stanchions. The other 19 cows in the herd were tied with chains and no abscesses developed in them. A swelling always develops where the lacto-vaccine is injected and pressure or irritation by rubbing may carry it on to abscess formation. In 857 cows (not in the experiment) given lacto-vaccine in the past eight months, not one has developed an abscess at the site of injection.

The lacto-vaccine used was prepared from milk from an acute or chronic case of mastitis. To each 100cc of infected milk 1cc of gentian violet or brilliant green was added and let stand for 30 minutes. It was then ready for use and was used within a week. Three injections are given at weekly intervals; 15cc the first week, 20cc the second week and 25cc the third week. A new batch of vaccine is made up each week.

The mixed bacterin used was Bovine Formula No. 2; *Streptococcus* (pyogenic) hemolytic and non-hemolytic 50% *Corynebacterium pyogenes* 30% and *Escherichia coli* 20%.

C. R. Corson

Middlebury, Indiana

Simple Restraint for Castrating Large Boars

Of all the means of restraint of large animals, the common methods for restraining large boars for castration have seemed to be the least satisfactory to veterinarians in general.

In my practice I have been called upon to castrate a considerable number of mature boars so that they could be marketed eventually as stags. The method of castrating boars in the standing position seems to be more of an acrobatic feat than a surgical operation, as the boar invariably squats during the operation. Any method of throwing and tying boars for castration works fine with small hogs but is rather a difficult job on the larger animals, as well as often dangerous to the operator and his helpers. Also the field of the operation is seldom presented in a position that is convenient to the operator.

Thus through efforts to devise a safe, quick and simple method of restraint so that really a professional operation could be performed, the following has given very satisfactory results, especially in the larger boars.

The boar is confined in a small inclosure to make catching easier. Then use a lariat or similar rope with a slip noose in it to catch the animal. The loop is placed on the ground just in front of one of the hog's hind feet and he is forced to step into it. Raise the rope up above the hock joint and pull the loop tightly around the leg. Raise the leg and tie two half hitches above the hock to secure the rope more tightly. Take another rope and tie it to the other hind leg much the same as the first leg is tied.

The loose ends of the ropes are tossed over any horizontal piece eight or more feet above the ground. Any ceiling beam in a barn or hog house, or even a limb of a tree, will do. However the ropes should be kept as far apart as possible to spread the boar's legs.

Then gradually work the boar backward until his hind feet are raised off the ground. Continue taking up on the ropes until you have raised the hog high enough so that his

front feet are just firmly in contact with the ground. Thus he will attempt to pull forward making castration easier.

His scrotal region is now about shoulder high and the testicles have dropped into the lower portion of the scrotum. Then disinfect the scrotal area as desired, make incisions directly over each testicle and remove in the usual manner. The castrated hog is easily freed from the ropes.

The ease of such an operation will surely meet with favor among those who, like myself, have been dissatisfied with their means of restraint for large boars. It is also worthy of note that incisions from this method should be so low as to be nearly unnoticeable from the posterior view when the hog is standing in the normal position. This insures adequate drainage with the quickest possible healing and does not leave unsightly scars that can be seen easily when the animal is eventually placed on the market as a stag.

VIRGIL R. KELLEY, T/4, A.U.S.*
Coffeyville, Kansas

Parturient Paresis with Complete Prolapse of Uterus

On a hot Sunday afternoon about 5 P.M. (June 18th), I was called to the Walter Hill farm four miles south of Lewisburg to treat a cow that was reported to be down. The thermometer had been 102° F. in the shade during the afternoon.

When I arrived, I had quite a walk from the car to where the cow was lying on a slope with the head slightly down hill. She was in semi-sunlight as the sun was low and there was some shade from a tree.

The cow was in complete coma. The only evidence of life was shallow breathing and a slight movement of a froth that was in nostrils and mouth, standing up like beaten, white of egg.

The uterus was completely out on the ground and the owner, his wife and two farm helpers were fanning the flies off it.

This was a 7-year-old, Jersey with, probably, the 5th calf. A fair individual for which the owner had been offered $150.00. The cow had been seen that morning and she was all right but, as yet, had not calved. She was found in this condition, about a half-mile from their home, 30 minutes before they called me. She had calved that day some time after 10 A.M., had hidden her calf and apparently tried to get home for, when found, she was near a gate, which was closed, on her way home.

They had a man riding the field trying to find the calf but it was not located until the next afternoon. When found, it was all right and is now healthy and thrifty.

I explained the seriousness of this case to the owner and told him I did not think the cow had a chance to live. In their worry about the cow they had not thought of water or pan that I needed.

Mrs. Hill and the two helpers left at once to get the water and pan. Mr. Hill stayed to help me. I first gave two ounces and two drams of calcium gluconate in solution in the jugular vein. Then we picked up the uterus the best we could and taking the membranes off of it we began replacing the organ without washing it, since it being fairly clean, I thought it would be best not to wait for them to bring water, which would take 30 minutes to an hour. I was thinking of shock and was afraid the cow would die if I did not get the blood back into circulation at once. The cow, being in a complete coma and lying with head slightly down hill, it was not difficult to get the uterus back into position.

Soon after getting the womb replaced, we propped her up on her sternum and she immediately started belching, which relieved the bloat. She could not hold up her head. I next gave her one-half grain of atropine sulphate and 5cc of posterior pituitary extract subcutaneously. She was responding nicely at this time and we soon got her upon her feet. Then I siphoned three or four gallons of a mild creolin solution into the uterus. There was no straining, so I raked part of the solution out with my hand. Next one ounce of powdered sulfanilamide was placed within the uterus and three deep sutures taken in the vulva.

We started walking her toward home but the weather was so hot I advised them to leave her in the yard of their home over night. Water and three kinds of feed was offered to her but she refused to eat or drink for 24 hours. However, she was able to get up and down at will.

Late the next evening she drank about a quart of water but would not eat anything until Tuesday or thirty-six hours after her attack of parturient paresis. At that time she ate and drank a little. Wednesday she was eating and drinking fairly well and from then on she made a rapid and uneventful recovery and is now (August 5th) in perfect health and giving a fine flow of milk.

Two things surprised me. One is that she did not die and the other is, why she did not have a relapse of the milk fever.

R. H. SMITH
Lewisburg, Tennessee

*Sergeant Kelley, formerly a practitioner at Coffeyville, Kan., is now in the army and stationed in the East.

Results of Brucellosis Vaccination of Mature Cows

Herd No. 1.—August 15, 1939, a new cow was brought into this herd of 51 cows, heifers and a bull. Previously it had suffered no loss from abortion during recent years. About six months following the introduction of the new animal, five of the native cows aborted in rapid succession. All, including new cow, reacted positively to the agglutination test for brucellosis.

All animals in the herd were vaccinated March 16, 1940. One cow aborted after vaccination and was revaccinated while open.

In the four years and seven months that have elapsed since this herd was vaccinated there have been no other abortions. Every cow has produced a living calf at the proper time after breeding. Milk production increased after vaccination.

It would add to the completeness of the report if the reaction of non-aborters to the blood test could be given, and the period during which they and the aborters reacted positively after vaccination, but such tests were not made. I have been vaccinating for the prevention of abortion in this district for many years and cattle owners are well versed in its use. Only in exceptional cases will they go to the expense of a herd test. All they want is healthy calves and good milk production. They have been getting it for years from diagnosis and vaccination, and can't see the logic of running after a bus after it's caught.

Every cow in this vaccinated herd has produced a living calf at the proper time after breeding

Herd No. 2.—The history of this herd of 48 animals is very much like that of the preceding herd. An acute outbreak of abortions followed the introduction of a new cow in the herd, and five of the native cows aborted and were positive to the agglutination test for brucellosis. The entire herd was vaccinated October 8, 1942. No more abortions occurred until October of this year when a young cow aborted that was only four months old when she, with the rest of the herd, was vaccinated.

At the time the herd was vaccinated, a mastitis survey revealed 14 animals affected. Seven were sold for slaughter, as not being suitable cases for treatment. The remaining seven were treated and all seemingly recovered. Since there had been so much mastitis infection on the premises, all the other cows and all pregnant heifers were treated with neoprontosil as a prophylactic. There have been no cases of mastitis develop in this herd since. By strict sanitation, apparently we got rid of all the infection.

While I do not have as good results as this very often in handling mastitis, and never promise, or expect, them to be as good as in this case, I can't emphasize too strongly the importance of diagnosis and sanitation when one undertakes to eliminate mastitis from a herd. The owner will nearly always want to treat some of the hopeless and some, or all, of the doubtful cases. Don't do it! Although some of them may recover, on the average it doesn't pay the owner and it certainly doesn't pay the veterinarian. It prolongs the infection on the premises and conduces to the development of new cases of the disease, maybe months later, for which no cause can be found. It takes only a few of these to discourage, if not disgust, the owner and then all chance of keeping the herd free from mastitis has been lost. Only cases in which there is no detectable, permanent tissue change are suitable for treatment.

This reference to mastitis is interpolated because extensive development of mastitis in a herd is such a common accompaniment of an acute outbreak of brucellosis that it is almost to be considered a part of the brucellosis picture.

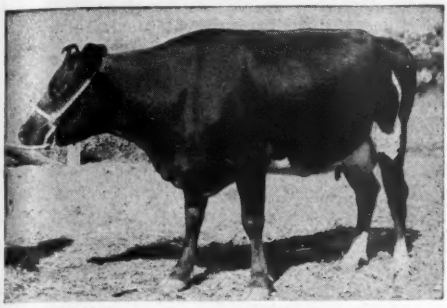
Frequently the loss from mastitis is materially greater than from the Brucella infection. This is just another, of many, reasons why brucellosis control should be handled by the local practitioner. Even if a state or federal man should succeed in eliminating brucellosis from such a herd the owner is likely to suffer great loss from the unattended mastitis. As Doctor Ray Birch said years ago, "The man with an outbreak of brucellosis in his herd needs expert assistance at his elbow."

Herd No. 3.—This was a small herd—18 animals all told. An acute outbreak of abortion occurred. The source of the infection was not determined. Four cows lost their calves in rapid succession and all reacted positively to the blood test for brucellosis.

All animals in the herd were vaccinated March 10, 1942. There were no further abortions in this herd for 2½ years. Last Septem-

ber a heifer aborted. Like the case in Herd No. 2, she was but four months old when vaccinated. She was revaccinated. What the result will be only time can tell.

Herd No. 4.—This was a herd in which brucellosis was chronic. An occasional abortion was occurring from time to time and when the herd was tested all 6 cows that had aborted



Halter for restraint in brucellosis testing

and three others reacted positively. The owner thought the disease had been introduced by a bull he had purchased some time before.

The entire herd of 21 cows and heifers was vaccinated March 1, 1942. Two more abortions occurred in the next two months.

May 16, the animals were revaccinated. More abortions occurred in the following weeks.

And then I woke up!

In this herd, I had abdicated in favor of the blood test, letting it make the diagnosis for me. That, of course, is not its function. The purpose of the test is to supply the clinician with certain information, useful in arriving at a diagnosis. As one will sometimes do, when work presses particularly hard and conditions look routine, I had really not examined this herd with a view to making a diagnosis. No question about it—I had slipped again.

A thorough investigation of the herd, its care, management and history and the pattern of abortions convinced me the trouble was nutritional—not infectious. Brucella infection undoubtedly was present, but it was quiescent and was not doing any particular damage to the herd, just then.

As a partial atonement for my obtuseness I purchased 100 pounds of vimogen out of my own pocket and the animals were given a liberal allowance of it on their feed. There were no more abortions, the breeding record and the milk production improved.

The owner of the herd improved the ration and continued to give vimogen. There have been no further abortions or other reproductive troubles in this herd in over two years.

S. L. STEWART

Olathe, Kansas

Scrotal Incarceration of the Small Intestine in a Steer

August 1, 1944, a 16-month-old, Hereford steer was presented for treatment with the following history: Castration had been performed at the age of three months. Following castration there was a slight edema and swelling in the scrotal region. Slight anorexia was noticed, but little significance was attached to the condition as the swelling soon subsided and convalescence was apparently complete.

Approximately a year later the owner noticed the animal was not eating normally. A fetid diarrhea was developing and, during a three-week period, the animal lost approximately 120 pounds in weight.

Symptoms.—The temperature was 104.3° F. A fecal examination was made and *Haemonchus contortus* ova were demonstrated. Upon rectal exploration, a firm mass was palpated in the inguinal ring.

Treatment.—The animal was prepared for operative treatment. It was given 18cc of a 2% solution of procaine hydrochloride epidurally. The scrotal area was infiltrated with the same substance. The area over the inguinal canal was shaved, and a pack moistened with a 1 to 1000 alcoholic solution of bichloride of mercury was applied.

As the operation progressed, it was revealed that a loop of intestine had been incarcerated within the connective tissues. Adhesions had taken place so firmly, that it was necessary to remove a six-inch portion of the intestine and perform an intestinal anastomosis. After the complete removal of the mass of proliferated connective tissue and section of intestine, the inguinal canal was packed with gauze saturated with liquid BIPP, and the edges of the skin were brought together with mattress sutures. A one-ounce capsule of sulfanilamide was given *per os* and 500cc of a 25% dextrose solution was administered intravenously.

After treatment consisted of daily administration of one-ounce doses of sulfanilamide *per os*. On the fourth day, the sutures and pack were removed.

The temperature at this time was 102° F. and the steer showed a feeble desire for bran and hay. A slight amount of feces, of apparently normal consistency, was passed on the fifth day. On the 12th day the animal was given one ounce of phenothiazine and discharged. At that time the appetite and defecation were normal and it showed no symptoms of peritonitis.

DEAN R. GROSS

Jacksonville, Illinois.

Dystocia Due to Gastrodidymus Octipes

A shorthorn cow in labor for 22 hours was brought to the clinic for delivery September 5, 1944. This cow was pasture bred and pregnancy was thought to be full term.

Vaginal examination revealed a fetus in posterior presentation with an oversized leg, which was thought to be a fusion of two hind legs, and a tail presenting in the birth canal. Further examination of the birth canal was impossible because of the emphysematous condition of the fetus.

Since this condition was thought to be a monstrosity, besides being emphysematous, a

This monster was removed by cesarean section

cesarean section rather than an embryotomy was decided upon.

Epidural anesthesia was used and the cesarean operation was performed in the flank region as described by Frank.[1] An incision approximately twelve inches long was at first made but later it was necessary to extend this incision an additional six inches to facilitate the removal of the large fetus, which by then was definitely known to be a monster. The fore limbs, of which there were four were extending anteriorly. Two hind limbs were flexed, and the remaining two were fused and extending through the birth canal.

The monster was removed and the uterine incision closed with two continuous rows of Lembert sutures. A mattress suture was used to close the skin incision.

Post-mortem examination of the fetus revealed the hair to be loose, indicating that it had been dead for some time. One umbilicus branched into four umbilical arteries and two umbilical veins in the abdominal cavity, with two umbilical arteries and one umbilical vein for each fetus. The fetuses had separate vertebral columns and two sternums with one-half set of ribs attached to each. One pericardial sac contained the two hearts. Each fetus had its separate circulatory system. Only one diaphragm was present which showed no indication of division. There was a duplication of all abdominal organs in a single abdominal cavity, with one peritoneum investing all of the viscera. There was an anastomosis of the posterior part of the large intestine for a short distance with a binary division resulting in two recti, with individual ani. The vaginae of this monstrosity emptied separately into the recti.

According to Williams[2] monsters are usually carried to full term. Such monstrosities present no clinical symptoms and their presence is not suspected until they have been expelled or have given rise to dystocia.

In this case I believe aberrant development of the embryo was probably due to the fertilization of one ovum which later underwent only partial division.

The dam developed a metritis shortly after the operation, but made an uneventful recovery.

REFERENCES
1. Frank, E. R. "Veterinary Surgery Notes."
2. Williams, W. L. "Veterinary Obstetrics."

ROBERT E. GUILFOIL
Columbia, Missouri

Spread of Anaplasmosis

Dr. George W. Stiles of the Bureau of Animal Industry in Denver has accumulated some data regarding the spread of anaplasmosis in cattle by unclean instruments used in dehorning, vaccination and other minor surgical operations. Of 61 cattle that had their horns tipped in a public stock yard, nine developed anaplasmosis; six recovered, three died.

In another investigation of 3000 cattle subjected to various minor operations, 355 developed anaplasmosis traceable to unclean instruments. This man-made anaplasmosis is, of course, wholly preventable through observation of sanitary precautions.

Facts, Fancies, Fads and Fallacies in Animal Nutrition

The medical scientist, like his contemporaries in other branches of science, has been too eager to grasp raw facts before enough time has elapsed for them to become ripe. As a result, the medical man has been forced to modify his premature advice, much to his chagrin and to the discredit of well intentioned scientists.

This situation has led the writer to phrase the following axiom: "The *facts* of yesterday may become the *fads* of today and the *fallacies* of tomorrow." The popular fictional character, Ephraim Tutt, expresses the same thought in his statement, "The accepted truths of today often become the falsehoods of tomorrow."

Take, for instance, the science of animal nutrition, with which veterinary science is so intimately concerned, as a concrete illustration. Twenty years ago we advocated feeding dairy cows a grain ration containing up to 25% protein. When Morrison and other animal husbandmen showed that a 16% protein ration was not only cheaper to buy but also that cows produced more milk on it, the fad died an ignoble death.

Then came the fad of feeding sour milk to prevent and cure coccidiosis in chickens which got off to a good start but was squelched when careful experiments proved sour milk to be of no value either as a preventive or a cure of coccidiosis.

For many years, first this remedy and then that, was tried by livestockmen and prescribed by their veterinarians to induce cows to come in heat, but to no avail. Some of the suggested remedies (yohimbine) became so popular as to constitute fads. Not until the development of the science of endocrinology was a hormone (estrogen) found which was even in a small way effective. Today we have the stilbestrol treatment for correcting sterility by inducing estrus, but that does not warrant the use of the hormone as a panacea for all reproductive disturbances.

The present day fad for vitamins has exceeded the fondest dreams of the advertising copywriters, the manufacturers, and the drug salesmen, all of whom have taken advantage of a gullible public. Everyone who read the report of the April, 1943 meeting of the National Wholesale Druggists Association that vitamin products constituted the largest single item handled by drug houses, with gross sales of more than $100,000,000 in 1942, must have been impressed with the extent of this prevailing fad. What is even more remarkable is the fact that no synthetic vitamin was offered for sale before 1937. Perhaps a third cause for astonishment is the 25% increase in 1943 over the extraordinary large sale in 1942; or was that to have been expected on the (sales) theory of striking while the iron is hot?

The following indirect quotation from a leading authority seems quite to the point: Vitamins are not a substitute for feed; they are non-energy producing, because they serve merely as accessory factors in the livestock ration; they must be present in adequate amounts to be effective. It is clear that the fad for the promiscuous use of synthetic vitamins for whatever ails an animal has been seized upon without due regard for known facts.

There are two reasons, in my opinion, why editors of veterinary publications should be careful in popularizing vitamins for livestock and poultry. The first is that these products

CHARACTERISTICS OF VITAMINS

	A	B-1	C	D	E	K	Riboflavin	Niacin	Pantothenic acid	Pyridoxine
Solubility.....	Fat	Water	Water	Fat	Fat	Fat	Water	Water	Water	Water
Resistance to heat.....	Good	Fair	Poor	Good	Good	Good	Good	Good	Good	Good
Resistance to drying.....	Poor	Fair	Poor	Good	Fair	Poor	Good	Good	Good	Good
Body storage...	Good	Medium	Slight	Good	Good	Good	Medium	Medium	Good	Good
Synthesized by ruminants...	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Synthesized in laboratory.	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Relative cost...	Considerable	Cheap	Cheap	Very Cheap	Considerable	Cheap	Cheap	Very Cheap	Cheap	Cheap

are not available in adequate quantities for animals at any price. The second is that they cost so much more than they are worth that they are not economical for the farmer to purchase for general use.

I am somewhat of a heretic in matters concerned with vitamins for farm animals. In fact, I have threatened to write a paper under the title, "Taking Some of the Bunk Out of Vitamins for Livestock and Poultry." Probably I will not get the final urge to whip it into acceptable form, so am submitting this contribution as a temporary expedient. At any rate, I am having a lot of fun musing philosophically over the proposal.

The characteristics of vitamins are summarized in the foregoing table which I compiled recently and have had checked for accuracy by a leading vitaminologist.

The answer to the problem seems to be a ration balanced, insofar as is possible, with natural vitamins rather than a ration spiked with artificial (synthetic) vitamins.

F. B. HADLEY

Madison, Wisconsin

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Hemoglobinuria in Calves

A grade Hereford calf four weeks of age was presented for treatment with a history, that the owner had noticed a reddish colored urine being passed frequently. The calf showed complete anorexia. This calf was one of six, all approximately the same age. They were bucket fed and allowed to run on native pasture. One calf had died but a necropsy had not been made. Two other calves had become sick but recovered with treatment. The remaining two calves, as yet, had shown no symptoms of disease.

When presented, the calf had a temperature of 105.4° F. The pulse rate was 112 and the respirations were 46 per minute. The conjunctiva and the oral mucous membranes were very pale. Depression and dyspnea were quite noticeable. A urine sample, which was deep red in color, was obtained. Microscopic examination of the urine revealed no microorganisms. A diagnosis was not made but it was decided to treat the case symptomatically. The calf was given 1000cc of whole citrated bovine blood intravenously, and 5cc of ascorbic acid (contining 200mg per cc) was given intramuscularly. Two days later an additional 500cc of citrated whole bovine blood was given. By this time the temperature was down to 103° F. and the urine was only slightly blood tinged. At the end of five days the temperature was 102° F. with no trace of blood in the urine. The calf drank milk and showed marked improvement. The case was discharged the fifth day.

A number of cases of this disease, particularly in calves, have been reported from Oklahoma, California, Colorado, Utah and Canada — thus indicating a wide distribution throughout the country. The cause of the disease has not been determined.

WALTER F. JOHNSON

Ottawa, Kansas

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Arsenical Poisoning in Cattle

Case No. 1.—March 1, 1943, the owner of a farm moved to town and a tenant took over the farm, including a herd of 25 cows. The next day I was called to see some sick cows and found eight lying around the yard in various positions. Most of the affected animals were unable to rise and were nearly unconscious. Lead poisoning was suggested and a search for the cause was instituted.

In the cattle shed we found an old baking powder can with holes punched in it to make a shaker. This was half-filled with arsenate of lead and flour. Assuming the cows had been unable to secure the poison from the shaker we continued the search and, after a good deal of hunting, found a paper bag trampled underfoot in the manure. This bag was empty, but showed evidences of having contained the same poison.

The shed in which the poison was found had been used as a machine shed and, since the potato patch was just back of it, it served as a convenient place to store the bug poison. When the owner moved away the machinery was taken out and the shed left open for the cattle and they soon found the poison.

Six large cows died and two smaller ones recovered.

Case No. 2.—Late at night August 24th of this year I was called to see a cow that the owner said was off in milk production. No light except from a poor lantern was available, which handicapped examination. The animal was treated for indigestion. I was surprised the next morning when the owner reported that the cow had died during the night.

The following evening I was called to this farm again; this time to treat two sick heifers. One was down and having convulsions. The other was standing quiety and was reluctant to move. The symptoms suggested some kind of poisoning.

This herd consisted of 19 milk cows and seven heifers. The owner stated that on the 22nd he had put the herd in a field of oat stubble, but had taken them out the next morning as they were molesting some chickens that were in a brooder house in the field. We walked over the field but found nothing that

we thought could have caused the trouble.

One heifer died that night and necropsy the next morning revealed severe gastritis and enteritis. The enteritis extended almost the full length of the small intestine, the contents of which were foul smelling. The following day the remaining sick heifer still refused to eat but was looking better, but the next day another cow was sick and the owner asked that I call someone in consultation to help locate the trouble. I had already suggested that the animals were getting to fresh paint, lead or potato spray. However, no painting had been done on the farm recently and the potato field was not near.

Two other veterinarians were called in and that afternoon the three of us and the owner made a thorough search of the oat stubble field but found nothing to account for the poisoning, which we all agreed was the trouble.

After we left, the owner of the cattle, somewhat discouraged if not disgusted, was telling his wife that we veterinarians could not talk of anything but paint poisoning or spray poisoning, when their little boy asked them what was in that barrel in the weeds. When the farmer had sprayed the potatoes in the early summer he had strained the mixture and put the coarse particles in this barrel. It had stood upright all summer but now was lying on its side where the cattle had upset it, when they were turned into the field of oat stubble, and had licked up the contents. The barrel was in a weed lot apart from the field which was supposed to have a good fence around it and so we had not found it. However, it seems that several animals had breached the fence and found the poison. The last two poisoned heifers made complete recoveries.

The moral, if any, of this tale probably is: when you want to find anything on the farm ask the children. This has been impressed upon me numberless times in the past 30 years, yet I neglected it in this case and thus let myself in for a lot of unnecessary labor.

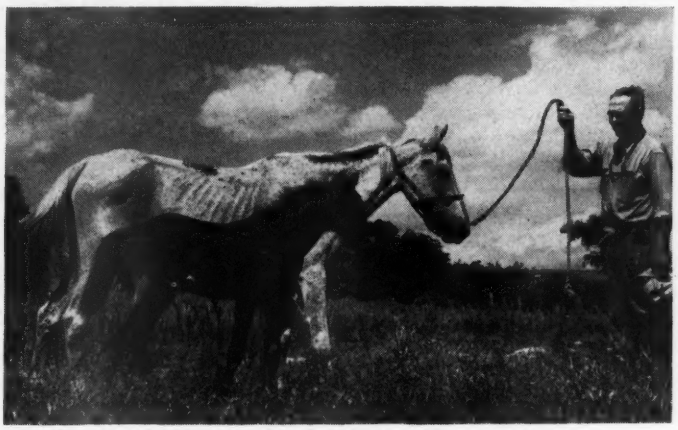
W. S. O'BRIEN

Ryan, Iowa

★★★ BUY WAR BONDS ★★★
AND HOLD THEM

Some Interesting Animals I Have Known

It is the veterinarian's duty to obtain the background of the animals he has to treat. Some of these are exceedingly interesting. Such a case was the mare, Jamie, owned by Dan D. Casement of Juniata farms near Manhattan. Jamie was brought to the Kansas State College veterinary clinic to have her teeth dressed and to be given a general check up. She is a 24-year-old, grey mare—a cross between a Spanish mustang and an American quarter horse. She was born in 1920, her sire was a New Mexico mustang named Con Cho Colonel. She was first bred to thoroughbreds belonging to the Remount Association and produced colts by The Dreamer, General Haig, Raphia, and Stormy Port. She has been bred to The Duce, grandson of her sire and for the past two years has been bred to Little Fred, a registered quarter horse. She was first bred when seven years of age and has been bred regularly ever since having had a foal each year for the past 17 years.



Jamie has been bred to many famous sires. Since she was first bred at the age of seven years she has had a colt each year—17 in all

During the revival of the Pony Express in 1923, Jamie ran one lap. The revival of the Pony Express celebrated the 60th anniversary of the original pony express and lasted five days. Jamie is believed to be the only horse still alive that participated in the revival of the Pony Express.

The photograph shown taken in September, 1944, and shows Jamie with her latest colt in the hands of their owner, Dan D. Casement, one of the best-known livestock men of the state.

EDWIN J. FRICK

Manhattan, Kansas

Abstracts

Dourine Trypanosome Transmissible to Avian Host

It has been demonstrated[10] that the parasite *Trypanosoma equiperdum* which causes dourine in horses, can be transmitted to an avian host. Of 10 ducks inoculated with mouse blood heavily parasitized with the trypanosome, there were two fatalities within 14 days. Mice injected with blood from the surviving eight ducks developed fatal parasitemias on the eighth day.

The implication of these findings as to possible reservoirs for similar mammalian parasites is obvious.

Intravenous Injections

Some 200 experiments with 20 intravenous drugs were made on 63 horses in order to determine the physiological and lethal effects.[2] Small amounts of air injected into the venous circulation have no effect, but injected into arteries may cause severe reactions. Isotonic saline solutions are injected in horses suffering from heat stroke, toxemia or dehydration. Reasonable dosage and temperature have no effect on the pulse, except temporary rise in blood pressure and hydremia. Excessive doses tend to produce pulmonary edema and respiratory failure. Hypotonic solutions injected intravenously cause a decrease in blood osmotic pressure. Lysis of erythrocytes with hemoglobin appears in all horses given over 4000cc of hypotonic solution. Hypotonic magnesium sulfate causes a lowering of coagulation time and slight depression occurs on injection of 500cc in 10% solution, but deep narcosis occurs when a 20% solution is used. Chloral hydrate depresses the cerebrum with little effect on the circulation or respiration. Dosages of from one to two ounces in a 6 to 10% solution, when given slowly, causes narcosis while two ounces prove lethal in some instances—particularly in old animals. Calcium gluconate increases the pulse and respiratory rates and produces hypercalcemia which lasts several hours. Intravenous gelatin has been recommended for shock treatment and to reduce the clotting time of blood and a 2% solution may be used in purpura hemorrhagica and in hemorrhage. Gelatin may be used also in race and work horses to reduce muscular fatigue. In blood transfusions, 500cc of citrated whole blood may be given to increase the clotting time and control hemorrhage. Horses can usually take large intravenous volumes of many drugs without injury.—*A. H. Bryan.*

[10] Seager, Lloyd D., University of Tenn. Transmission of *trypanosoma equiperdum* to the duck. *Sci.* 100:2602, p. 428.

[2] Roberts, J. S. (Ithaca, N. Y.). The effects of various intravenous injections on the horse. *Vet. Rec.* 56:31, pp. 271-276, 1944.

Effect of Vitamin B on Toxicity of Sulfonamides

Recent studies[7] have shown that some of the toxic effects of certain sulfonamide compounds were largely mitigated by certain fractions of the vitamin B complex, or by diets which have a high content of these factors. An experiment was devised which would permit rats to help themselves freely to the better known fractions of the vitamin B complex before and during the period in which they received constant amounts of a sulfonamide drug which is very toxic to rats. The intake of thiamine, riboflavin and pyridoxine greatly increased during this period—often sixfold over the amounts considered essential for normal nutrition. While taking the added amounts of vitamins the complete syndrome characteristic of reactions to the drug did not appear. All blood values improved significantly in the animals which ate larger amounts of the vitamins over those which received comparable amounts of the drug but only the usual allotment of vitamins.

Nodular Worm Infection in Sheep

The cause of nodules, common in the intestinal wall of sheep, was discovered by Cooper Curtis in 1890. He demonstrated the presence of small worms in the nodules and showed them to be the larval stage of a parasitic nematode, which he named *Oesophagostomum columbianum*. Although he concluded that this is the most injurious intestinal parasite of sheep, and many others have agreed with this conclusion, the nodular worm has not been the subject of extensive experimental study.

Sarles[8] divided a flock of 16, eight-month-old lambs into four groups.

1. Four controls.
2. Four given daily doses of 10 larvae each.
3. Four given daily doses of 100 larvae each.
4. Four given daily doses of 1,000 larvae.

All groups were fed an ample, nutritious ration. All were in excellent physical condition, when the experiment began. Administration of the larvae was continued for 28 days and the lambs were slaughtered at the end of 18 weeks from the beginning of the experiment.

[7] Higgins, G. M., Experimental effect of vitamin B on toxicity of sufonamides. *Proc. Staff Meet., Mayo Clinic*, 19, p. 202, 1944. Abst. from *What's New.*

[8] Sarles, Merrit P. Effects of experimental nodular worm *(Oesophagostomum columbianum)* infection in sheep. Tech. Bul. No. 875, U. S. Dept. Agr., 19 pages, 1944.

At the time of slaughter, the lambs in the control group were in good condition. The average dressed carcass weight was 53.5 pounds. The carcasses of the group that received a total of 280 larvae each were well filled out and in fairly good condition and had an average dressed weight of 50.7 pounds.

The carcasses of the medium-dose group were markedly poorer than those of groups 1 and 2, and the dressed weight averaged but 40.4 pounds.

Group four was in bad condition at the end of the experiment, emaciated, anemic and with ragged, broken wool light in weight and of poor quality. The average weight of the dressed carcass was but 22.1 pounds.

It is concluded that the debilitating effects of nodular worm infection in sheep are mainly due to interference with the normal intestinal functions produced by the nodular involvement of the intestinal wall, that follows penetration of the larval stage of the parasite.

Pemmican

Stefansson[9] reviews the history of dried meats and of pemmican in particular. To make pemmican the Indian removed every trace of fat, split the lean into thin sheets and hung it up for wind drying. When thoroughly dry, the lean was converted into pounded meat. Bags were made of the hide of the animal in question (buffalo hide for buffalo meat, caribou for caribou meat and so on). These pillow size rawhide bags were filled loosely with pounded meat. Suet was then poured into the bag so as to percolate everywhere. The mouth was sewed up before the fat had time to harden completely and the bag tramped on or otherwise pressed so as to become flat, with a usual thickness of 6 or 7 inches. Pemmican seems to have kept as well in Oklahoma as in Manitoba. There are records of ten, twenty and more years in perfect condition. The author thinks that if our army used pemmican we could reduce by a third or half the weight and bulk of the meat element in a combination ration; with its nearly or quite exclusive use for certain purposes, we could reduce by a third or half the total weight and bulk of present special emergency or survival rations —such, for instance, as Army ration K, and we would have, from the start, a food which, in heat or cold, in moist or dry, is not experimental; an ancient Indian food that has been proved out by thousands of white users.—*J. Am. Med. Ass'n*, 126:10.

It may be noted in this connection that most writers on pioneer times on the plains describe Indian pemmican as containing, in addition to dried lean meat and tallow, various dried berries and plums. This addition of fruit made it more palatable and, perhaps, a more nearly adequate ration.

[9] Stefansson, V. Pemmican. *Mil. Surg.*, 95:5 (Aug.), p. 89, 1944.

Action of Vitamin B_1 in Shock

The author[12] reviews the work of a number of investigators and reports:

1. The liver of a thiamine deficient mouse cannot store glycogen.

2. When shock was induced in a number of dogs by fractional bleeding and thiamine administered to half of the number, they lived longer than the untreated half.

3. A B_1 avitaminosis was produced in nine dogs and 16 were thiamine fortified by a diet rich in B_1. All were bled to induce shock. Seven of the thiamine deficient animals went into shock after a bleeding of less than 4% of the body weight. All of the fortified dogs required greater bleeding than this and seven required abstraction of more than 5% of the body weight by bleeding to induce shock. Copious intestinal hemorrhage occurred in the vitamin deficient dogs but did not occur in the fortified ones. The author believes that the use of thiamine is indicated in shock.

Vitamin C-Sulfonamide Compounds in Wound Treatment

Ruskin[8] reviews the literature on the role of vitamin C in the healing of wounds. He believes that the local effect of the ascorbic acid is independent of the systemic level of vitamin C. Vitamin C locally applied to wound tissue presents an additional factor in healing. The relationship of ascorbic acid to the bacteria in the wound area has been investigated, and the conclusion has been reached that ascorbic acid serves as a detoxicating agent. The possibility of using vitamin C in chemical combination with the sulfonamide drugs opened up a most interesting avenue of investigation. The chemical properties of ascorbic acid are such as to reduce the alkalinity of the sulfonamides. The vitamin also lends a hygroscopic factor which tends to prevent caking of sulfanilamide, thus prolonging uniform absorption. In order to have visual control of the advantages of the sulfonamide ascorbate, the drug was used in chronic, nonhealing wounds of long standing, particularly those in which bone was involved. Such easily visualized wounds involving bone are found in unhealed cavities following radical mastoidectomies and in ears with chronic suppura-

[12] Govier, William M. Rationale of the use of vitamins in the therapy of shock and anoxia. *J. Am. Med. Assn.*, 126:12, pp. 749-750, 1944.

[8] Ruskin, S. L., Vitamin C-sulfonamide compounds in healing of wounds; *Archiv. Otolaryn*, 40, p. 115, 1944.

tive otitis media and defects of the drum membrane. The routine procedure was to irrigate the ear cavity, dry the area and then fill the mastoid cavity, the middle ear and the external canal with the sulfanilamide ascorbate. The author presents a number of cases which indicate that sulfanilamide ascorbate and sufathiazole ascorbate both stimulate healing with epithelization.—*J. Am. Med. Ass'n*, 126:10.

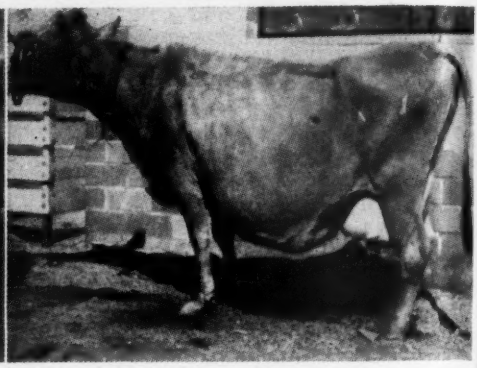
Rupture of the Prepubian and Subpubian Tendons in the Cow

For years the author[11] has held and taught the rupture of the prepubian tendon in the cow is a physical impossibility, because of the additional support given this structure by the subpubian tendon. And further, that reported cases of prepubian tendon rupture in cows and ewes were in reality abdominal hernias. During the past 14 years he has investigated (at necropsy or slaughter) 10 cases that were reported as being rupture of the prepubian tendon in cows. Without exception all were hernias in the thin aponeurotic section of the abdominal wall.

The eleventh case investigated proved to be a true rupture of the prepubian tendon and of its supporting structure, the subpubian tendon also. This was diagnosed by the exaggerated upward deflection of the pelvis (see illustration) and was confirmed by postmortem examination.

The subject was a grade Holstein. The owner had noticed that she was getting very large several weeks before she was due to calve. For several days, prior to parturition, she lay down most of the time but was able to get upon her feet. Unassisted she gave birth to healthy, normal twin calves and, for a few days thereafter, could rise only with extreme difficulty. The photograph from which the illustration was made was taken seven days after parturition by which time she could get upon her feet with less difficulty. The upward deflection of the pelvis was not noted prior to calving and the conclusion is that rupture of the tendons occurred during labor.

Rupture of the prepubian and subpubian tendon
Note the upward deflection of the pelvis and the bench-like standing position of the cow on the left.



Rupture of the abdominal aponeurosis

[11] Emmerson, M. A. Rupture of the prepubian and subpubian tendons in the cow. Univ. of Pennsylbania, *Vet. Ext. Quar.*, No. 94, pp. 1-15, 1944.

Outbreak of Psittacosis in Army Pigeons

Psittacosis in man of psittacine or passerine origin is well known but psittacosis of pigeon derivation was first reported in 1940 and altogether but few cases have been reported.

An army pigeon breeding and training company[13] was losing young pigeons from an acute infection characterized by loss of appetite, disinclination to fly, rapid loss of weight, dry mucous membranes, green sticky droppings, occasional vomiting and catarrh of the upper respiratory tract. The mortality was about 15%.

A diagnosis of psittacosis was confirmed by Major Smadell of the Harvard Red Cross Laboratories which are located in England. By means of the complement fixation test it was determined that a considerable percentage of adult pigeons in England have antibodies in the blood and presumably have had the disease.

As a treatment, the sulfa drugs were ineffective. Symptomatic treatment including 500 I. U. of vitamin A daily or freshly chopped green foods or carrots gave good results. It is necessary to protect the young birds from dust in the loft and to observe the usual sanitary precautions employed in handling an infectious disease.

[13] Blount, R. A. V. C., Major W. P. Psittacosis in pigeons. *J. R. A. V. C.*, 15:4, pp. 81-83, 1944.

Feeding Habits and Effect Upon Coccidiosis

In extensive experiments[4] the authors found that when chickens had access to feed at all times they were more resistant to coccidiosis than when they were not fed until after 7:00 a.m. They conclude that the presence of feed in the digestive tract of the birds before they had opportunity to pick up the oöcysts makes them resistant to infection. One factor to be considered is the fact that it takes only one hour for the oöcysts and sporozoites to reach the cecal membrane through an empty stomach, while three hours or longer is needed in chickens with full crops. The upper digestive tract is an unsuitable habitat for the development of *Eimeria tenella* and any delay in the passage of oöcysts or sporozoites through that part of the intestinal tract may be detrimental to them.

However that may be, the difference in susceptibility to coccidiosis is believed by the authors to be sufficiently great to justify recommending that poultrymen keep feed before chickens at all times.

Intradermal Test for Bovine Trichomoniasis

The author[5] has had a large experience with trichomoniasis in cattle in Northern Ireland. He regards the difficulty of diagnosis as being the greatest weakness limiting control measures and he has developed an antigen, "tricin," to be used as an allergic test for the disease.

Advantages of the tricin test are (1) it is easily applied and reactions are readily interpreted being comparable in these respects to the intradermal tuberculin test. (2) Early and mild cases of trichomoniasis react positively in a high percentage of cases.

Disadvantages of the tricin test are (1) cases complicated by metritis often fail to react positively, (2) recovered cases react positively, (3) very severe cases of trichomoniasis may not react positively and (4) for these reasons it is not suitable as an individual test but only as a herd test.

In the control of trichomoniasis, clinical examination, herd history, direct microscopic examination, the serological test and the intradermal test, all should be employed. Of these the author regards the last named as the most useful, but its interpretation should be correlated, always, with the herd history.

[4] Edgar, S. A., and Herrick, C. A., Feeding habits in relation to the severity of cecal coccidiosis-eimeria tenella. *Poul. Sci.*, 23:1, pp. 30-35, 1944.

[5] Kerr, W. R., The intradermal test in bovine trichomoniasis. *Vet. Rec.*, 56:24, pp. 303-307, 1944.

Wound Treatment

Following a review[17] of the literature on the use of tissue extracts to accelerate healing, the author describes his own experiments on dogs and results of treatment in nine clinical cases. The tissue extract was prepared from adult sheep hearts. Bilateral wounds were inflicted on the dogs and it was demonstrated that the treated sides healed 40% faster than the controls. In the clinical cases at each time of treatment, Dakin's solution was applied to the wound for approximately 10 minutes, and then copious amounts of saline solution were used to flush out all traces of chlorine. Then gauze sponges soaked with tissue extract were applied to the wound and covered with cellophane and suitably bandaged. Eighty per cent of the treated areas were unequivocally healed much before the expected healing time of the control curve. Infection, degree of contamination and, possibly, type of invading bacteria may influence the efficacy of extract and hence healing of wounds.

Cattle Grubs

This is a popular discussion[19] of the cost of cattle grubs, the life history of the parasite, the treatment of infected cattle and the means to eradicate the heel fly from the whole country.

It is stated the cost of cattle grubs cannot be determined. The deterioration in the value of hides due to the grubs amounts to 10 million dollars annually. Beef cattle infested with grubs gain up to one-fourth pound per day less than treated animals and there is a lowered milk production by dairy cattle. The total cost of grubs is estimated to exceed 100 million dollars annually.

Spraying the back of infested animals with a suspension of derris or cube powder is the treatment of choice or, where large numbers are to be treated and vats are available, dipping is recommended. For spraying, the animals should be confined in a chute and the spray applied at 400 pounds nozzle pressure. An orchard sprayer is suitable for the work.

Since the adult heel fly travels but a short distance area eradication is particularly feasible and easy of accomplishment. A national eradication campaign based on county areas is urged.

[17] Hoffman, R. S., and Dingwall, James. An experimental and clinical study on the use of adult animal tissue extract in the acceleration of wound healing. A preliminary report. *Surg., Gynec., Obst.*, 79:103-108, 1944. Abst. from *Med. J. Facts*, 5:1, p. 67, 1944.

[19] National Livestock Loss Prevention Board. Cattle grubs must go. Booklet, 1944. Copies may be had free on application to the Board, Livestock Exchange Bldg., Chicago, Ill.

Buy War Bonds—to have and to hold

Book Reviews

Backyard Poultry Keeping. By *G. T. Klein*, Poultry Extension Specialist, Massachusetts State College, 144 pages, 77 illustrations. Published by Everybody's Book Publishing Co., Hanover, Pa., 1943. Price $1.50.

This is an excellent little work with a field of usefulness much broader than the title suggests. Every phase of poultry raising is discussed, plans for the building, equipment for the building, plans for homemade brooders, directions for selecting a breed, for brooding, watering, feeding and care—all as they apply to any small, non-commercial flock—are given out of the author's broad experience in keeping a small flock, experience with commercial flocks and as an extension specialist in poultry raising. Attention is given to keeping the flock healthy and to preventing the development of vices.

Directions are given for the care of eggs, for killing, picking and dressing birds. Numerous recipes for preparing eggs and poultry meat in various ways for the table are included.

The illustrations in this work have been selected with care and are a valuable supplement to the descriptive text.

* * * *

The Conquest of Bacteria from Salvarsan to Sulfapyridine. By *Sherwood Taylor*, 177 pages, illustrated. Published by the Philosophical Library, New York. 1942. Price $2.50.

This work is an attempt, and an unusually successful one, to tell a story of scientific achievement in popular language. The subject, of course, is one of gripping interest—sickness and death—or to reverse it, life and health.

The triumphs of Jenner, Pasteur, Lister, von Behring, Ehrlich and Domagk have never been more interestingly or forcefully told. The manuscript was written before the days of penicillin.

The Greeks are credited with the two greatest discoveries in medicine, (1) disease is a natural process, not basically different from physiological processes and (2) the human body possesses animate healing power which tends to overcome lesions and restore health.

Biological research, particularly bacteriological research, is credited with tremendous achievements in the field of disease prevention but, save for a very few diseases, notably diphtheria, has not aided in the treatment of the sick man or animal, according to the author. The value of biological research achievements in disease prevention, however, is limited because (1) for the majority of diseases no means of prevention are known and (2) the methods of prevention that have been developed are not generally applicable. Thus, for example, purification of drinking water and the proper disposal of sewage largely prevent typhoid fever, but these measures are applicable only to enlightened, wealthy communities. Most of the world's population is excluded from benefit from the discovery. Or screening against mosquitoes prevents malaria, yet 300 million persons constantly suffer from that disease and it causes a million deaths a year because most of man's habitations are not adapted for screening or the inhabitants are unable to screen them. Therefore biological research has ameliorated the malaria problem only in minor degree.

The author holds that, contrary to the common assumption, curative medicine has far wider application than preventive medicine and is more important. Furthermore, curative medicine is often the most feasible of preventives of disease. It is a criticism of bacteriological research, notwithstanding that it has done so much, that it has absorbed all public funds expended upon medical research for 60 years—relegating to commercial interests all research into chemotherapy.

A disadvantage of commercial research in the field of chemotherapy is that, of necessity, the cost of it must be added to the cost of the product developed and thus the sick—those least able to bear it—must shoulder the expense of the research. An even greater disadvantage is the delay in announcing discoveries while preparations are made to exploit them. In the case of the sulfa drugs, announcement of Domagk's discovery was delayed from 1932, when it was first made, till 1935, at a probable cost of thousands of lives.

In the 16th century it was discovered, empirically, that mercury cures syphilis and, in the 17th century, that quinine cures malaria. No further advance in chemotherapy was made until the brilliant work of Ehrlich in 1907 supplanted mercury with arsenic and, in succeeding years, discovered among the dyes cures for most of the important tropical diseases due to protozoa. The importance of these discoveries is not generally appreciated.

The opportunities for curative medicine are enormous and largely unexploited, because of lack of public support. The death rate from kala-azar, bilhariasis, sleeping sickness and dysentery, to mention only four, make our own [the British] mortality tables look almost blank. An estimate that 300,000 lives are saved annually by the use of antimony in the treatment of kala-azar is conservative. Ten million persons in Egypt, alone, suffer from bilhariasis which can also be cured by antimony.

The economic value, alone, of atabrine to the armed forces in the past three years is incalculable.

Successful treatment of bacterial diseases began, practically, with the therapeutic use of the sulfonamides in 1932. The triumphs of sulfonamide therapy are strikingly told.

The author emphasizes that the research in chemotherapy has been wholly dependent upon private initiative and private funds. Far from being exhausted he thinks the field of chemotherapeutic agents likely has not been, as yet, even surveyed.

* * * *

Trichinosis. By *Sylvester E. Gould,* M.D., D.Sc., Pathologist and Director of Laboratories, Eloise Hospital, Assistant Professor of Pathology, Wayne University College of Medicine, 356 pages, 127 illustrations. Published by Charles C. Thomas, Springfield, Ill., 1945. Price $5.00.

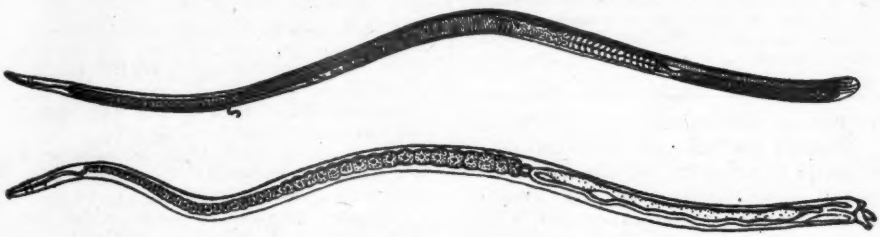
The first thing that strikes the reader of this volume is the vastness of the literature on trichinosis. The nematode worm which we now call *Trichinella spiralis* has preyed upon man and his animals since the earliest recordings of human activities, and man's history, both sacred and secular, contains frequent references to it. The author quotes approvingly Hegner's statement "When an endoparasite occurs in several species of hosts, the parasite is probably older than the host, having adapted itself to hosts that evolved after it became a parasite." Since the Trichinella is parasitic upon an extrordinary range of species (mouse, rabbit, beaver, domestic cat, polecat, palm civit, dog, wolf, coyote, fox, marten, ferret, badger, raccoon, bear, mongoose, pig, wild boar, rat, coypu, hedgehog, marmot, mole, hippopotamus and man, naturally, with successful experimental inoculation in many herbivorous mammals and some birds), the ancient lineage of the parasite is argued.

A key to the author's approach to the subject is found in the thrice quoted statement of Hall (Maurice C.): "In view of the great frequency of trichinosis in the general population, this disease is considered to be one of the major health problems in the United States."

This nematode appears to have been responsible for the proscription of pork as food by both Moses and Mohammed, and for the abstinence to this day of millions of the Jewish and Mohammedan faiths. Of more direct veterinary concern it appears to have been responsible for the development of meat inspection in Germany and largely responsible for the initiation of meat inspection in this country and, in fact, for the establishment of the Bureau of Animal Industry in the U. S. Department of Agriculture.

In view of the infrequent reports of deaths from trichinosis at the present time, the reader will be surprised at the record of epidemics of this disease that have occurred in the past 150 years; epidemics in which the victims were numbered in hundreds and even thousands.

"The author hopes this volume will also be found to have a direct interest for the public health worker, the epidemiologist, the swine grower, the veterinarian, the sanitary engineer and the meat packer; for these are the specialists upon whom depend the ultimate control and prevention of trichinosis. It is believed that this parasitic worm disease, now all too prevalent and too often fatal, can be controlled and possibly eradicated in this country."



Trichinella spiralis.
Above, female, enlarged; below, male, enlarged. From Leuckart.

The author is convinced that trichinosis is caused solely by eating trichinous pork and that trichinous pork is mainly due to feeding uncooked garbage to swine and in minor part to pork scraps (chiefly from garbage fed swine) that find their way into kitchen slops. This information of course is not new to veterinarians.

It appears to this reviewer that rather more effort than was necessary is expended in exploding the convenient fable that swine acquire trichinosis from rats.

This work is a valuable contribution to the available information on trichinosis. About one-third of it deals with the disease in animals—the remainder is medical.

An Introduction to Public Health. By *Harry S. Mustard,* B.S., M.D., LL.D., Director and Professor of Public Health, Delamar Institute of Public Health, College of Physicians and Surgeons, Columbia University, Second edition, 283 pages. Published by the Macmillan Co., 1944. Price $3.25.

This is a difficult text to evaluate from a veterinarian's viewpoint. Were the interest of veterinarians engaged in public health work or who contemplate such career confined to food inspection and the control of diseases communicable from animals to man, then it could be stated that the work possesses no interest or value to them. However, since the interest of everyone concerned with public health as a professional career is wider than his field of direct activities, this work possesses some chapters that are of value to what the author terms "subordinate personnel." Among such discussions the chapter on "Backgrounds and Association of Hygiene and Public Health" is outstanding. The chapters on vital statistics and on sanitation can be endorsed with reservations for the information of general interest that they give. The subject of public health organization and administration should fall within the group of general interest but it is so inadequate as to be a disappointment to the reader, seeking information on the subject.

The author's conception of the place of veterinary medicine in public health is stated in five lines. "Veterinarians come into the public health picture particularly in connection with those diseases of animals which may affect man: especially bovine tuberculosis, undulant fever, rabies, anthrax, glanders, tularemia, and in the inspection of foods derived from meat." There is no word of the inspection of animals prior to slaughter, of fish, oysters or other sea foods, of milk and milk products, of supervision of sanitation in meat processing plants or in plants where milk and milk products are pasteurized or on dairy farms. Perhaps it is just as well it is so, for in another place in the text the author reveals that his conception of the object of meat inspection is protection from trichinosis. Nowhere is any hint given of what veterinarians may do in the "picture" in "connection with those diseases of animals which may affect man."

Any book reviewed in these pages, or any other book if available, may be obtained by remitting the published price to VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago 49. Bulletins and Circulars should be requested direct from the address given in the notice. Generally they are supplied free unless a price is stated.

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Taxes & Business.—Postwar Tax Policy and Business Expansion. Brookings Institute, Washington, D. C. Price 50 cents.

Distomiasis.—Studies of Pathology in Cattle Produced by Liver Flukes. Bulletin 408, Oregon Agr. Exp. Sta., Corvallis.

Swine Diseases.—Swine Diseases Prevention and Control. Ext. Bul. 143, Univ. of Idaho, Col. of Agr. Ext. Div., Moscow.

Disinfection.—The Penetrative Powers of Disinfectants. Tech. Bul. 183, Mich. Agr. Exp. Sta., East Lansing.

Plant Poisoning.—Poisonous Plants. *Bulletin* (Vol. 36, No. 8) Virginia Polytechnic Inst., Blacksburg.

Acetonemia.—Acetonemia a Vitamin A Deficiency. Reprint, The Borden Company, Special Products Division, 350 Madison Ave., New York, N. Y.

Intestinal Parasites of Poultry.—Some questions and answers about "worms" in chickens and turkeys. Cir. 150, Oregon Agr. Exp. Sta., Corvallis.

Cattle Grubs.—Cattle grubs or heel flies with suggestions for their control. Farmer's Bul. No. 1596, U. S. Dept. of Agr., Washington, D. C.

Poultry Breeding.—Fertility in the Male Domestic Fowl. Research Bul. 347, Missouri Agr. Exp. Sta., Columbia.

Markets for Rabbit Products; Rabbit Profits.—Reliable Fur Industries, 2209 Whittier Blvd., Montebello, Calif.

Range Paralysis. — Avian Leucosis and Lymphomatosis. Wyoming Agr. Exp. Sta. Bul. No. 266, Laramie.

Animal Disease Control.—Thirty-seventh and thirty-eighth annual reports North Dakota Livestock Sanitary Board. State Veterinarian, Bismarck.

Animal Nutrition.—The Nutritional Deficiencies in Farm Animals on Natural Feeds. Reprint from *Ann. Rev. Biochem,* C. F. Huffman, East Lansing, Mich.

Sheep Parasites.—Effects of Experimental Nodular Worm (*Oesophagostomum columbianum*) Infection in Sheep. Tech. Bul. No. 875, U. S. Dept. of Agr. Washington 25, D. C.

Lend-Lease.—Sixteenth report to the Congress on Lend-Lease Operations (April 1 to June 30, 1944). The Library of Congress, Washington 25, D. C.

Veterinary Association Report. — Proceedings of the Kansas Veterinary Medical Association for 1944. Dr. Chas. W. Bower, Secretary, 1128 Kansas Ave., Topeka, Kans.

Reconversion.—Production, Jobs and Taxes, published under the auspices of the Committee for Economic Development by McGraw-Hill Book Co., New York. Price $1.25.

Wild Life Information.—Poverty or Conservation: Your National Problem, by Jay N. "Ding" Darling. National Wild Life Federation, 1212 Sixteenth St., N.W., Washington, D. C.